

# **PRIORITIZING APPROACHES TO ECONOMIC DEVELOPMENT IN NEW ENGLAND: SKILLS, INFRASTRUCTURE, AND TAX INCENTIVES**

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## EXECUTIVE SUMMARY

Along with the rest of the country, New England is beginning to pull out of the “Great Recession,” but the recovery is expected to be slow and uneven. With hundreds of thousands of workers having lost their jobs, tens of thousands of families having lost their homes, and the prospect of continued high rates of unemployment in the region for years to come, policy makers will continue to face pressure to create jobs and improve the economy. The policies available to states are limited, both in their range and their potential to create large numbers of jobs, but there are options that can help create jobs and increase economic growth.

The available evidence suggests that the most effective options for creating jobs, in the short- and long-term, are investing in infrastructure and building the skills of the current and future workforce. Tax cuts and business subsidies on the other hand, do little to create jobs in the short-run, and are not the most effective approaches to generating growth over the long-term.

### **Rebuilding a deteriorating infrastructure**

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Physical infrastructure is a vital component of the New England economy. Firms and households depend on the roads, bridges, ports, drinking water, sanitation, and energy production and transmission infrastructure that is built and maintained by the public sector. In a typical year, state and local governments provide 42 percent of all infrastructure investments in the United States—\$325 billion in 2007.

State and local infrastructure projects are effective at creating jobs in the short-term in part because they leverage additional resources from the federal government and the private sector, and because they employ local workers, equipment, and materials to a greater degree than other types of economic activity. Including federal matching funds, construction of infrastructure projects produces as many as 52 per million dollars invested by state and local governments in New England. The largest levels of employment are generated by investments in mass transit systems, while the smallest are from electricity transmission and distribution infrastructure.

The benefits are not limited to short-term job creation, though, since infrastructure has a lasting impact on a region’s productivity. The research demonstrates that state-level infrastructure investments have a positive

and significant impact on economic growth. Among the recent findings are:

- Increasing the stock of infrastructure by one percent in New England increases demand for production workers between 0.37 and 0.47 percent.
- In the typical state an increase in the public capital stock by ten percent boosts total output in the economy by 1.2 percent.
- Investments that increase the stock of public infrastructure by ten percent lower costs in the manufacturing sector by 2.3 percent.
- Each additional dollar spent on public infrastructure benefits businesses and households by as much as \$1.37.

Investments in mass transit systems and clean energy production and transmission have the added benefit of reducing carbon emissions and facilitating the development of more compact urban communities, which use fewer fossil fuels, are less congested, and have been shown to be more productive.

While there is ample evidence of the economic importance of investment in physical infrastructure, the public infrastructure stock has been allowed to deteriorate for many years. Annual average growth in the per-capita stock of public infrastructure was faster than the national average in most New England states in the 1960s, but by the late 1990s and early 2000s had fallen below the national average in all but one.

As infrastructure investments have declined, the list of critical infrastructure in need of replacement and repair has grown. Between one-quarter and two-thirds of major roads in New England are in poor or mediocre condition, and 40 percent of bridges are structurally deficient or functionally obsolete. Over the next twenty years New England needs nearly \$13 billion in additional investment in drinking water infrastructure. Transit systems and school facilities in the region also need millions of dollars of investments just to maintain current capacity.

### **Improving the education and training of the future and current workforce**

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High quality education has become a requirement for accessing good jobs and developing a productive workforce in modern economies. The vast majority of educa-

tion and training received by most workers is delivered by public schools; 89 percent of pre-K through 12th grade students and 74 percent of college-level students nationally attend public schools.

Education and training help individual students and workers by increasing their skills and giving them opportunities to achieve higher earnings. Companies benefit by having more productive workers who are able to learn quickly and adjust to changing economic conditions. A more skilled workforce not only helps attract firms and investment to a place, but numerous studies have demonstrated that investments in education at all levels generate economic growth and jobs. Education spending has been found to raise gross state product, increase employment in metropolitan areas, and raise personal income at the state level.

Additional research has documented the impacts of specific educational and training investment, including:

- Reducing elementary school class sizes from 25 to 15 students creates net benefits to society exceeding the cost of the program by nearly \$66,000 per student over 20 years.
- Comprehensive high school reform efforts raise the long-term earnings of graduates by 17 percent, boost attendance, reading and math scores, and generate net social benefits that exceed program costs by nearly \$150,000 per student over 20 years.
- Customized training programs, where community colleges collaborate with employers to develop training programs for incumbent workers, have saved and created thousands of export-oriented jobs in Massachusetts at a cost of less than \$9,000 per job.
- Participants in community colleges' occupational and vocational training programs received increased earnings of \$400 per quarter, for at least four years following program completion.

Regions with greater concentrations of highly educated workers have experienced considerably faster economic growth in recent decades. Higher education institutions have been shown to contribute to that growth in part by doing the work of educating students, but also because university research activities attract high-skilled workers, and spur entrepreneurship. Attracting students from other states and regions to University towns also boosts economic activity.

Recent long-term longitudinal studies of experimental high-quality preschool programs for low-income children show the impacts on high school graduation, college attendance, incarceration, employment, and earnings are substantial. Results from these experimental evaluations suggest that adoption of universal high-quality preschool would have sizeable economic impacts. Over the long-term, implementation of universal preschool would generate 2.3 million jobs annually nationwide, including more than 130,000 in New England.

The current education system, however, is inadequate to meet the region's needs. State and local government appropriations for higher education are below the national average in five of the six New England states. All of the states impose higher tuition than the rest of the nation, making affordability a real problem in the region. Only four New England states have public preschool programs, and in three of those states the programs reach few students and are funded at low levels.

Public elementary and secondary schools are relatively well funded in New England and have higher test scores and lower dropout rates than most other states. Even performance in the K-12 system, however, suggests substantial room for improvement. Nearly 23,000 students dropped out of New England high schools in 2008, and the dropout rates in Maine and Rhode Island exceed the national average. On 8th grade reading and math tests approximately one-fifth of New England students demonstrated below basic skill levels. Students in Rhode Island perform below the national average on both tests, and even in Massachusetts – the state with the overall highest test scores – roughly one out of six students demonstrates below basic skill levels on the math and reading tests.

### **Tax incentives and corporate subsidies have little impact**

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Another approach to economic development by state and local governments in New England and across the country is the provision of tax incentives and subsidies to corporations. These tax incentives and subsidies reduce costs – thus increasing profits – for firms that locate, expand, or invest in a state or region. The amount of state revenue dedicated to these credits is considerable: from around \$400 million annually in Maine and Vermont to \$1.7 billion in Massachusetts for tax incentives alone.

Rigorous studies of these incentives and subsidies, however, suggest that their impacts are modest at best. As much as 96 percent of the jobs and most of the investments used to claim tax credits would have been created even without the incentives. Some studies do find an impact on economic growth; one widely quoted finding from a literature review suggests that a ten percent reduction in business taxes will increase an area's economic activity by around 2 percent. Much of that activity, however, is simply employment and investment that would have otherwise occurred in a neighboring city or state. The best research suggests that virtually all research and development activity used to claim tax credits is simply redirected from neighboring states. In the cases in which jobs are actually created, research suggests that one-third to one-half go to people from outside the state or region.

These findings, paired with concerns over the methodology used in some of the studies supporting corporate tax incentives and subsidies, have led many researchers to conclude that these initiatives have no meaningful impact on a region's economy.

In the long-run, tax incentives cannot be expected to transform regional economies because they do little to alter the productive capacity of a region. Some modest number of jobs may be created for a time, but tax incentives and subsidies deplete the resources available for public investments that can actually improve a region's infrastructure and increase the skills of the workforce. As an example, one analysis finds that a long-term \$875 million annual incentive program in New England would produce just 9,000 jobs, compared to over 130,000 if those resources were invested in high-quality universal preschool in the region.

### **Financing economic development in the face of declining budgets**

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Given existing resources, states are not able to continue funding programs at current levels, let alone implement economic development initiatives. States will be forced to generate new revenues and prioritize how they are spending their current resources in order to sustain and expand investments in education and infrastructure.

Most states, including all of New England, have already taken action to raise taxes during last two budget cycles. There is arguably room for further tax increases targeted toward affluent households (which have

reaped the lion's share of gains from economic growth in the last few decades, but continue to face the lowest effective state and local tax rates) to support public spending for education and infrastructure in New England. Low interest rates and favorable bond ratings suggest there is also room for bond-financed infrastructure projects in New England.

In addition to generating new revenue, states are being forced to prioritize how they allocate current resources. Part of that process should be reconsideration of existing tax expenditures, which allocate tax revenues before they are collected through exemptions for certain groups or activities, often corporations. Total tax expenditures have grown rapidly over the last two decades in New England, and are anticipated to reach \$1 billion in Vermont, \$3.5 billion in Maine, \$5.6 billion in Connecticut, and \$23 billion in Massachusetts in the next budget year. Annual tax expenditures for corporate incentives and subsidies are more than \$400 million in the smaller New England states and are well over \$1 billion in Massachusetts. Given the evidence of relatively weak impacts of tax incentives on economic growth, states should consider reallocating these tax expenditures toward more productive uses.

### **Conclusion**

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State policymakers will continue to face pressure to create jobs in New England for several more years. The available evidence suggests that the most effective approaches are to improve the region's schools and infrastructure. Instead of trying to lure firms with deals and lower corporate taxes, an approach to economic development that builds the skills of the current and future workforce, improves the physical infrastructure of regions, and makes communities more attractive places for families and firms represents a more effective use of a state's scarce resources.

## I. INTRODUCTION

Along with the rest of the country, New England is beginning to pull out of the “Great Recession,” but the recovery is expected to be slow and uneven. An extended period of high unemployment will leave states facing continued budget shortfalls as well as pressure to take action to create jobs and generate economic growth. These dual pressures frequently result in a trade-off being posed between funding state services and efforts to “create jobs,” often through tax cuts and “economic development” initiatives. This trade-off, however, is false.

In many cases the most effective options for creating jobs are the same options that support public services. Spending and investing in areas at the core of the public sector mission – providing education and maintaining infrastructure – are effective at creating jobs in the short-term and building prosperous economies over the long term. Repairing roads and bridges, implementing high-quality early childhood education programs, initiating comprehensive high school reform and class-size reduction efforts, upgrading and extending mass transit services, expanding efforts to train the current workforce are all options that need additional support and have been shown to create jobs and generate economic growth. The tax cuts and business subsidies approach to economic development, on the other hand, will do little to create jobs in the short-run, and is not the most effective approach to generating growth over the long-term.

Economic and budget pressures are requiring states to prioritize how they allocate resources. Part of that process should be to consider whether the use of tax-based economic development incentives, widespread and growing over the last decade, is the most efficient way to foster economic growth. Instead of trying to lure firms with deals and lower taxes on corporations, an approach to economic development that builds the skills of the current and future workforce, improves the physical infrastructure of regions, and makes communities more attractive places for families and firms represents a more effective use of a state’s scarce resources.

This report begins with a review of the extent of the economic damage done in New England during the Great Recession – focusing on job growth, unemployment and foreclosures – as well as the nascent recovery and expectations for growth over the next few years. Then it explores the literature on the tax incentives and subsidies approach to economic development, and discusses the limitations of that approach. Next the report considers the economic impacts from investments in infrastructure and education services, reviewing the findings from a large body of literature. Finally, the report describes the anticipated budget climate for New England over the next few years and considers how states in the region will be able to afford financing key public services.

## II. IMPACTS OF THE GREAT RECESSION AND THE ECONOMIC OUTLOOK

The recession that hit New England and the rest of the country at the end of 2007 destroyed millions of jobs and caused millions of families to lose their homes. The most recent indicators do suggest that the worst has passed, with job growth returning and the number of foreclosures receding. But, recovery is expected to be slow, with unemployment remaining high for several years to come.

Between December 2007 and November 2009, 8.5 million jobs were eliminated in the U.S., including 348,000 in New England (table 1, panel a). New England's job loss was less severe than the national average, with 4.9 percent of jobs lost compared to 6.1 percent nationally. One New England state, Rhode Island, did fare worse than the national average, losing 7.2 percent of total employment.

Over the same period the rate of unemployment doubled, from 4.9 to 10 percent for the U.S. and 4.5 percent to 8.9 percent in New England (table 1, panel b). Increases in the unemployment rate were greater

than the national average in Massachusetts, New Hampshire, and Rhode Island, but well below the national average in the remaining New England states.

Job losses, long-term unemployment, and the precarious mortgages that helped drive the housing bubble and ensuing financial meltdown, caused millions of families to lose their homes to foreclosure. Nationally, 2.8 million properties faced foreclosure filings in 2009, representing 2.2 percent of all properties (table 2, p. 6). The number of properties facing foreclosure in 2009 is more than double the number in 2007 and up by 22 percent over filings in 2008. The foreclosure rate in New England is lower than the national average, representing 1.2 percent of all properties, but more than 71,000 properties faced foreclosure in 2009. Starting from a very low base, the number of foreclosures in New England states exploded in 2008, rising by 150 percent, but declined in 2009, down by 13 percent across the region.<sup>1</sup>

In late 2009 the job losses that started in 2007 and accelerated in 2008 finally subsided (figure 1, p. 6). By early 2010 employment numbers were starting to rise in New England and most other parts of the country.

TABLE 1. LABOR MARKET CONDITIONS IN NEW ENGLAND IN THE GREAT RECESSION

PANEL A.  
TOTAL NONFARM  
EMPLOYMENT  
(THOUSANDS OF  
SEASONALLY  
ADJUSTED JOBS)

				total change			percent change		
	Dec-07	Nov-09	Jun-10	Dec-07 to Nov-09	Nov-09 to June-10	Dec-07 to June-10	Dec-07 to Nov-09	Nov-09 to June-10	Dec-07 to June-10
Connecticut	1,704.3	1,610.7	1,621.6	-93.6	10.9	-82.7	-5.5%	0.7%	-4.9%
Maine	620.2	587.9	591.0	-32.3	3.1	-29.2	-5.2%	0.5%	-4.7%
Massachusetts	3,288.9	3,143.9	3,182.3	-145.0	38.4	-106.6	-4.4%	1.2%	-3.2%
New Hampshire	647.6	618.7	632.2	-28.9	13.5	-15.4	-4.5%	2.2%	-2.4%
Rhode Island	488.5	453.1	451.4	-35.4	-1.7	-37.1	-7.2%	-0.4%	-7.6%
Vermont	308.5	296.0	293.9	-12.5	-2.1	-14.6	-4.1%	-0.7%	-4.7%
New England	7,058.0	6,710.3	6,772.4	-347.7	62.1	-285.6	-4.9%	0.9%	-4.0%
United States	138,152	129,697	130,470	-8,455	773	-7,682	-6.1%	0.6%	-5.6%

PANEL B.  
UNEMPLOYMENT  
RATE  
(SEASONALLY  
ADJUSTED)

				total change			percent change		
	Dec-07	Nov-09	Jun-10	Dec-07 to Nov-09	Nov-09 to June-10	Dec-07 to June-10	Dec-07 to Nov-09	Nov-09 to June-10	Dec-07 to June-10
Connecticut	4.9	8.7	8.8	3.8	0.1	3.9	77.6%	1.1%	79.6%
Maine	4.7	8.1	8.0	3.4	-0.1	3.3	72.3%	-1.2%	70.2%
Massachusetts	4.4	9.2	9.0	4.8	-0.2	4.6	109.1%	-2.2%	104.5%
New Hampshire	3.4	6.9	5.9	3.5	-1.0	2.5	102.9%	-14.5%	73.5%
Rhode Island	6	12.5	12.0	6.5	-0.5	6.0	108.3%	-4.0%	100.0%
Vermont	4	6.7	6.0	2.7	-0.7	2.0	67.5%	-10.4%	50.0%
New England	4.5	8.9	8.6	4.4	-0.3	4.1	97.8%	-3.4%	91.1%
United States	4.9	10	9.5	5.1	-0.5	4.6	104.1%	-5.0%	93.9%

Source: PERI analysis of BLS data.



TABLE 2. FORECLOSURE IN THE NEW ENGLAND STATES 2007 - 2009

	Total properties with filings	% of housing units	Rank	Change in # of properties with foreclosure filings	
				2007 to 2008	2008 to 2009
United States	2,824,674	2.2	-	81.2%	21.2%
New England	71,394	1.2	-	150.0%	-13.4%
Connecticut	19,679	1.4	21	84.9%	-10.2%
Maine*	3,178	0.5	41	896.9%	11.5%
Massachusetts	36,119	1.3	22	150.0%	-18.5%
New Hampshire*	7,210	1.2	26	436.0%	8.6%
Rhode Island	5,065	1.1	27	258.2%	-23.1%
Vermont*	143	0.1	50	372.4%	4.4%

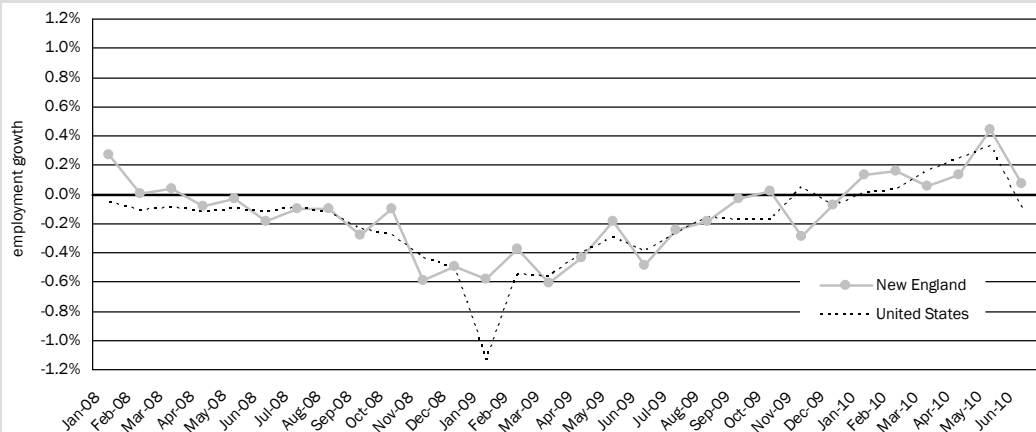
Source: PERI analysis of foreclosure data from Realtytrac.com

\*Actual increase may not be as high due to data collection changes or improvements

Total employment increased 0.9 percent in New England and 0.6 percent nationwide between November 2009 and June 2010. In much of the region, though, the recovery remains shaky. Employment figures for the smaller New England states (Maine, New Hampshire, Rhode Island, and Vermont) have fluctuated widely, with strong gains between December 2009 and February 2010 and a steep decline in March and April 2010 before rising sharply in May 2010 (figure 1, panel c, p. 7).<sup>2</sup> Along with the rest of the country, the already modest rate of job growth slowed in all New England states, and actually fell to zero in Connecticut and Massachusetts. Two states, Rhode Island and Vermont, had fewer jobs in June 2010 than in November 2009.

So far, the early phase of the recovery has been slow and uneven. Looking forward, unemployment is expected to peak in 2010, with job growth not sufficient to absorb new entrants to the labor force, before

FIGURE 1  
GROWTH IN NON-FARM  
EMPLOYMENT,  
DECEMBER 2007 -  
JUNE 2010  
PANEL A. U.S.  
AND NEW ENGLAND



PANEL B.  
CONNECTICUT &  
MASSACHUSETTS

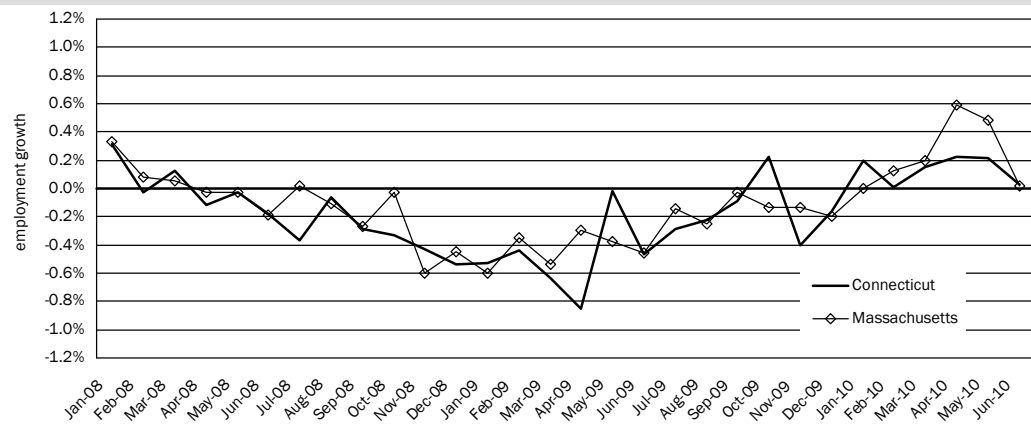


FIGURE 1. PANEL C.  
MAINE,  
NEW HAMPSHIRE,  
RHODE ISLAND AND  
VERMONT

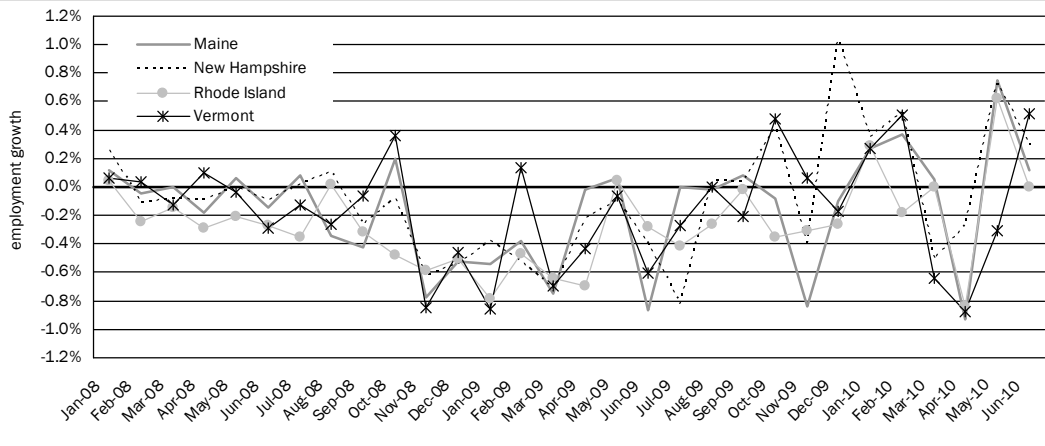
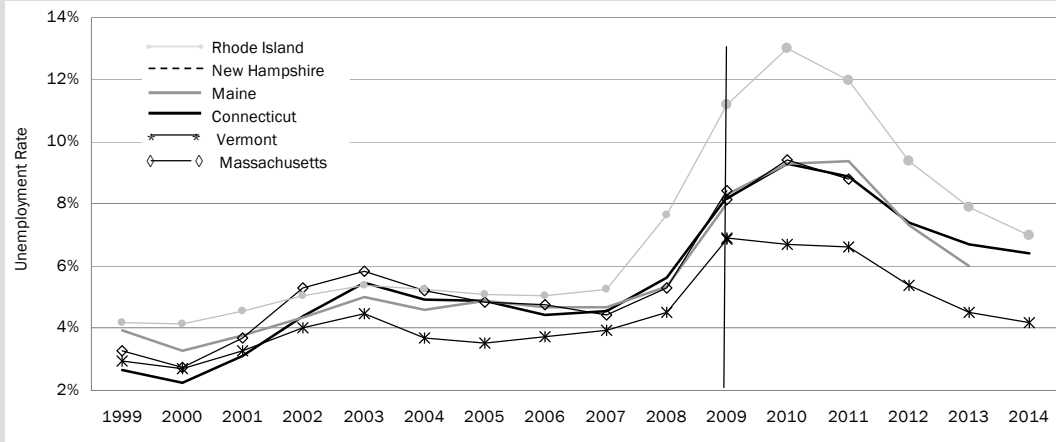


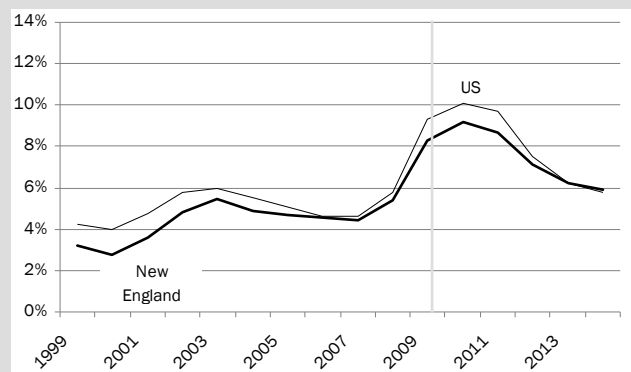
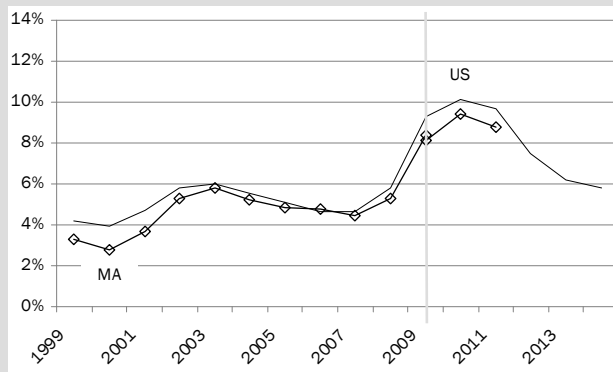
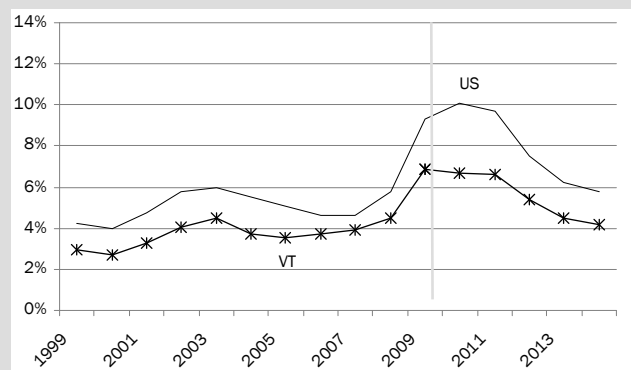
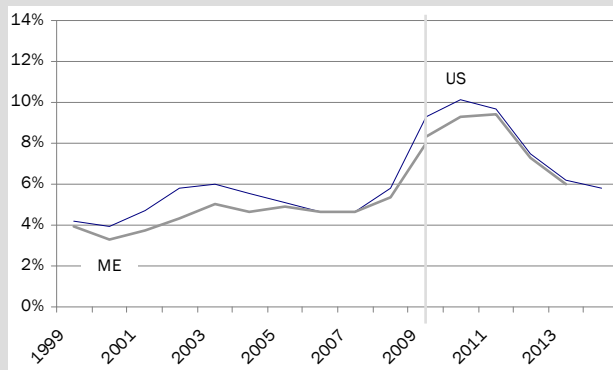
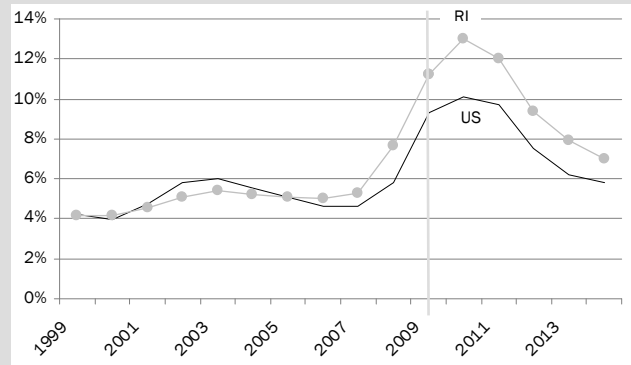
FIGURE 2.  
UNEMPLOYMENT  
FORECASTS IN NEW  
ENGLAND



Sources: CT, NEEP CT Economic Outlook May 2010; MA, DOR Briefing Book, FY2011 Consensus Revenue Estimate December 2009; RI, Consensus Economic Forecast by Moody's, May 2010; VT, NEEP forecast, May 2010.

it starts declining in 2011 (figures 2, 3, pp. 7-8). Economic forecasts for the U.S. economy and the New England states call for unemployment to remain above the elevated levels from 2008 as late as 2013. Unemployment will not return to the low levels of 2007 and earlier until sometime in 2015 or beyond. Jobs lost in the recession will not be replaced until the end of 2013 (NEEP, 2010).

FIGURE 3. UNEMPLOYMENT FORECASTS IN NEW ENGLAND



## II. COMPETING APPROACHES TO ECONOMIC DEVELOPMENT

With hundreds of thousands of workers having lost their jobs, tens of thousands of families having lost their homes, and the prospect of continued high rates of unemployment for years to come, state policy makers in New England are being called on to take steps to create jobs and improve the economy. It is true the policy options available to states are limited, both in their range and their potential to create large numbers of jobs. There is simply no substitute for sound economic stimulus policies from the federal government. Moving beyond the recession, however, there are some options available to state lawmakers to help create jobs and increase economic growth. The available evidence suggests economic development strategies that focus on making regional economies more productive – by investing in infrastructure and building the skills of the current and future workforce – have greater payoff in terms of jobs and economic growth than the approach that relies on subsidies and tax cuts for corporations.

### The tax cuts and subsidies approach to economic development

A common approach to economic development used by state and local governments across the country and in New England is to provide a variety of financial incentives and subsidies with the goal of increasing employment and investment. These tax cuts and subsidies reduce costs – thus increasing the return – for firms that locate, expand, or invest in a state or region. The highest-profile examples of this type of economic development are the broad packages of subsidies and incentives to attract large industrial facilities or corporate headquarters, as well as the large subsidies given for building sports stadiums. More common are the tax incentives available to all firms, either in certain industries or undertaking certain activities. Film industry tax credits are a prominent example of the first type of tax incentive, while investment, R&D, and job creation tax credits are standard examples of the second type of tax credit. In some form, most of these tax credits have been adopted by most New England states.<sup>3</sup> The New England state with the fewest of these tax credits is New Hampshire, which only has a small R&D tax credit. State and local governments also offer a range of property-tax abatement programs, including Enterprise Zones and Tax Increment Financing (TIF).

The state revenue dedicated to these tax credits is considerable. In Fiscal Year 2009, Rhode Island reported spending \$33 million on six of its tax incentive programs, and Connecticut reported spending \$556 million on corporate income tax deductions and credits.<sup>4</sup> Maine spent \$2.1 million for jobs and investment tax credits and \$2.8 million for shipbuilding credits in 2009, and \$66 million in business equipment tax rebates. Analysis by regional budget experts suggests these credits have been growing rapidly for years. A review of the evolution of economic development tax incentives in Massachusetts shows they have expanded from \$1.25 billion in 2002 to \$1.7 billion in 2010.<sup>5</sup> Analysis of the use of corporate income tax credits in Connecticut shows that they grew from under \$3 million in 1987 to nearly \$306 million by 2009.<sup>6</sup>

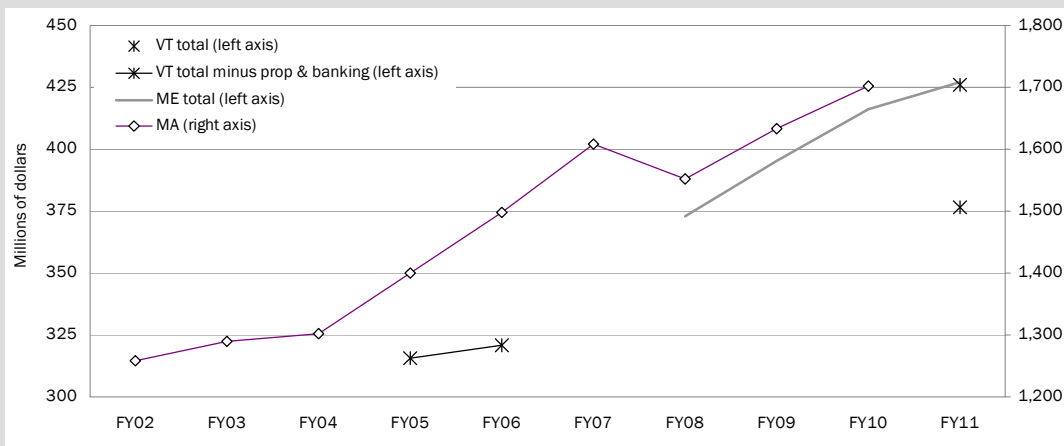
Because the timing, content, and standards for reporting tax expenditures all vary across states, it is difficult to develop a comprehensive and comparative analysis of the level and changes in economic development tax expenditures.<sup>7</sup> Using the same methodology as the Massachusetts Budget and Policy Center, similar measures of economic development tax expenditures can be developed for some other New England states

TABLE 3. ECONOMIC DEVELOPMENT TAX INCENTIVES IN NEW ENGLAND (MILLIONS OF INFLATION-ADJUSTED 2010 DOLLARS)

	MA	VT		ME	
		total	total less property tax and banking tax expenditures	total	consistent series
FY02	1,259				
FY03	1,289				
FY04	1,302				
FY05	1,401				
FY06	1,498		361		163
FY07	1,608				163
FY08	1,553			395	174
FY09	1,634			404	189
FY10	1,703			426	204
FY11		426	377	427	209

Source: MA: Massachusetts Budget and Policy Center, "Economic Development Tax Expenditures," December 2009.; ME, VT: PERI analysis of state data (Maine Revenue Service "Tax Expenditure Report" for 2007 and 2009; Vermont Department of Taxes "Tax Expenditure Report," various years, communication with Vermont state tax officials.)

FIGURE 4. GROWTH  
IN ECONOMIC  
DEVELOPMENT TAX  
INCENTIVES



(table 3, p. 9 and figure 4).<sup>8</sup> After climbing steadily for years, economic development tax expenditures – including those in the personal and corporate income, sales and use, property, and other taxes – rose to \$426 million in Vermont and \$400 million in Maine in the most recent fiscal year.<sup>9</sup>

#### HOW EFFECTIVE ARE ECONOMIC DEVELOPMENT TAX INCENTIVES AND SUBSIDIES?

Supporters of corporate tax incentives and subsidies have sometimes made claims of large increases in jobs and investment. There are good reasons to be skeptical of these claims, which in many cases have relied on unrealistic assumptions, including the assumption that all jobs or investments used to claim a credit are created because of the credit.<sup>10</sup> Rigorous studies of the impacts of incentives and economic development subsidies suggest the impacts are much smaller. The impact of tax incentives and subsidies is small because they do not increase the productive capacity of a state's economy, and primarily reward firms for taking actions they would have taken even without the incentives. The incentives do nothing to change demand conditions facing firms, and ultimately have little impact on costs either, as they are quite small compared to the costs of labor, land, energy, and a whole host of other factors of production.

To be sure, among the hundreds of studies conducted on a wide variety of economic development tax incentives and subsidies, many have found positive effects on employment and investment. Some of these include studies by Bartolome (1997) and Goss and Phillips (1997). But, the general consensus from reviews of the voluminous literature suggests that the impacts are

modest (Bartik, 1991, 2005, Wasylenko, 1997, Weiner, 2009.) The most widely quoted result in the literature is from Wasylenko's 1997 review, which shows that a ten percent reduction in business taxes will increase an area's economic activity by around two percent.

There are a number of important caveats in interpreting even this modest impact as a measure of the economic development that can be anticipated to result from tax incentives and subsidies. For one thing, at least some of the measured impacts on jobs and investment are activities that would have otherwise occurred in neighboring cities and states. If one region lures jobs through tax incentives at a neighbor's expense, there is no net benefit to the region or the county. Further, the losing neighbor might be expected to respond in-kind, undermining the temporary job gains in the initial state and leaving both with fewer resources to provide public services. The best research suggests this "beggar thy neighbor" aspect of economic development policies is a reality. A San Francisco Federal Reserve Bank economist (Wilson, 2009) has shown this is the case for state R&D tax incentives, with "nearly all" of the research "generated" by these incentives simply drawn from neighboring states. Chirinko and Wilson (2008) show that state investment tax credits, while boosting investment in the enacting state, may also be simply diverting investment from neighboring states. The findings of that research, though, are mixed.

Another concern is that many of the jobs created do not go to current residents of the community or state implementing and paying for the economic development policy. Bartik's research (1993, 2006) suggests that in the short-run between 20 and 50 percent of jobs cre-

ated through economic development incentives will go to people who would have otherwise lived somewhere else, but move to an area because of the newly created jobs. He also finds that the share of jobs going to immigrants rises over time. Recent work by Renkow (2003) shows that the share of jobs going to non-residents is particularly large in urban areas, one-half, compared to one-third in rural areas, and that most of the non-residents taking these jobs change their commuting patterns rather than residence.

An additional limitation of tax incentives and subsidies is that they are not very well targeted. For example, Faulk's (2002) analysis of employment tax credits in Georgia shows that for every ten jobs that employers use to claim the tax credit, fewer than three are arguably created because of the credits. Drawing lessons from the broader literature, Bartik (2006) concludes that more than ninety-five of every hundred jobs used to claim tax credits would have existed without the credit: "in only 3.7% of the cases is the subsidy needed, and in the other 96.3% of cases, the subsidy simply benefits the subsidized business with no economic development benefits for the state economy." (Bartik 2006, 16)

A final comment on the limitations of tax incentives and subsidies is that they do not pay for themselves. Even though these policies may create some jobs, it has been shown that they do not boost income and earnings sufficiently to offset the tax dollars used to finance the incentives (Weiner, 2009 and Bartik, 1994, 2005).

Because of this list of serious drawbacks, along with concerns over the methodology used in much of the research, and some contrary findings in other studies, a number of researchers conclude that state economic development initiatives have no meaningful impact on a region's economy. In an analysis titled "Do Taxes Matter? Yes, No, Maybe So," McGuire (2003) highlights the large portion of statistically insignificant findings and many implausibly large outliers in the studies reviewed by Wasylenko (1997) and Bartik (1991). Because of these concerns and the consistent inability of the findings to be replicated in other settings and periods, McGuire suggests there are good reasons to remain skeptical about any consensus around state-level taxes and incentives having much impact on employment.<sup>11</sup>

In a similar vein of critique, Netzer (1997) casts serious doubt on what could truly be concluded from this body of research. In a comment on some of the major stud-

ies in this literature, he notes the logical absurdity of some of the findings, writing – in response to a finding similar to those described by Wasylenko (1997) where a 10 percent increase in economic development funding is supposed to have increased employment by two percent:

"consider what this means for a largish state with a generous economic development budget of \$50 million and total employment of 3 million people. The coefficient says that a \$5 million increase in the state agency's budget will increase employment in the state by 60,000, at a cost per job of \$83. And a doubling of that budget would increase employment by 600,000. Who needs oil wells, when a state can be another Kuwait just by increasing the budget of a tiny agency?"

In addition to this set of concerns, a number of high-quality studies have shown that economic development incentives have very small or no impact on employment. Tannenwald's (1982) study of the federal New Jobs Tax Credit (NJTC) from the 1970s showed incredibly few jobs were created as a response to the credit. Based on an extensive employer survey combined with the payroll records of Wisconsin firms, Tannenwald found that even most firms with knowledge of the NJTC did not increase hiring. Overall employment rose by just 0.04 percent for each one percent reduction in the price of labor implied by the credit. Most firms did not hire because demand for their product simply did not warrant increased production.

More recently Lee (2008) used a large national longitudinal data set of manufacturing firm locations and found that the tax and financial incentives of state governments have only very weak impacts on manufacturing firm relocation decisions. New and relocating plants of existing corporations are often the target of economic development subsidies, but these policies are shown to not be very effective.

A number of studies of one of the largest groups of economic development programs – Empowerment Zones and Enterprise Zones, which include a set of geographically targeted tax incentives and subsidies – have shown that despite large tax subsidies these programs have not created jobs. In one carefully designed study Hanson (2009) finds that the federal Empowerment Zone program "has had no effect on employment and poverty." Similarly, Neumark and Kolko (2010) show

that the California Enterprise Zone program has no observable impact on employment. Multiple studies by Fisher and Peters (1997, 2002) raise serious doubts about the potential for Enterprise Zones, or other economic development incentives, to create jobs in an efficient manner. Fisher and Peters show that even in the programs with the largest subsidies, the size of the incentives remain so small compared to the costs to the firm that the incentive alone cannot justify hiring workers if demand and other economic conditions do not warrant that decision. They also find that a considerable share of jobs at firms benefitting from Enterprise Zone incentives are held by workers who do not reside in the zone, but instead commute from other neighborhoods.

Giving more weight to these studies, as well as the set of caveats discussed above, additional reviews of the literature have concluded that economic development

tax incentives and subsidies have had very little, if any, positive impact on jobs or investment (Peters and Fisher, 2004; Buss, 2001, Lynch, 2004.) The conclusion reached in these reviews is that a more effective economic development strategy lies in building the skills of the workforce and the quality of the infrastructure. Peters and Fisher (2004) write that state government officials need to give up the idea that they can micromanage the economy through incentives and subsidies, and instead accept “a more sensible view of the role of government – providing the foundations for growth through sound fiscal practices, quality public infrastructure, and good education systems.”

## IV. THE ECONOMIC IMPACTS OF PUBLIC SERVICES AND INVESTMENTS

In the long-run tax incentives cannot be expected to transform regional economies because they do little to alter the productive capacity of a region. Some modest number of jobs may be created for a time, but tax incentives and subsidies deplete the resources available for public investments that can actually improve a region's infrastructure and increase the skills of the workforce. A more traditional approach to the role of state and local governments holds greater promise by providing public services that simultaneously have an impact on firms' cost of doing business and building the productive capacity of a region's infrastructure and workforce. Basic public investments make areas more productive and competitive in ways that also make them better places that are more attractive to families and firms.

The perspective that investments in infrastructure and education can have an important impact on the economy finds considerable support in much of the literature reviewed by Wasilenko (1997) and Bartik (1991, 2005). Looking across cities in the Washington D.C. metropolitan region, Mark, McGuire and Papke (2000) find "higher levels of nonwelfare public service expenditures are estimated to increase employment growth." Fox and Murray (1990) study firm location decisions using county-level data in Tennessee, and find that, while some taxes matter to some types of firms in the short-run, "the most robust results relate to long-run policies such as the presence of interstate highways and rail infrastructure and educational policy, as evidenced by years of education attainment." Hoyt et al (2008) examine the impacts of various incentive programs using panel data for Kentucky counties, and conclude "training incentives have a strong, positive effect on economic activity, whereas tax incentives have a more modest positive effect." Helms' (1985) study on state tax and spending patterns found that for spending on "improved public services (such as education, highways, and public health and safety) the favorable impact on location and production decisions provided by the enhanced services may more than counterbalance the disincentive effects of the associated taxes."

### **Rebuilding and improving a deteriorating infrastructure**

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Physical infrastructure is a vital component to a region's economy. From roads, bridges, and ports to drinking water and sanitation, and even energy production and transmission, firms and households depend on the infrastructure that is built and maintained by the public sector. There is ample evidence of the economic importance of the physical infrastructure, from jobs to productivity, but the public capital stock has been allowed to deteriorate for many years in the U.S. The updating and repair of the infrastructure nationally and in New England represents an important economic development opportunity to create jobs and make the region more competitive.

State and local governments are responsible for the single largest portion of the nations' physical infrastructure. From roads, bridges and airports, to dams, sewers and waterways to drinking water, state and local governments build and maintain most of the infrastructure in the United States. State and local governments play the most significant role in maintaining the infrastructure, investing \$325 billion in 2007.<sup>12</sup> In a typical year, state and local governments provide 42 percent of all infrastructure investments in the United States.<sup>13</sup> Total non-defense public assets in America are valued at \$8.2 trillion, accounting for more than half of all non-residential private assets.<sup>14</sup>

#### THE SHORT-TERM IMPACT ON JOBS

One of the arguments in support of infrastructure projects is that they generate jobs. Depending on the scale of the project, anywhere between hundreds and thousands of highly paid workers can be employed building and maintaining infrastructure projects. Of course these projects have to be paid for, and if paying for infrastructure expansion depresses economic activity to a greater extent than what is generated by the project, then there will be no net gain in employment, just shifting across sectors. As Heintz et al (2009) show in their study of the economic impacts of infrastructure, however, these investments have the potential to generate considerable net increases in employment. Net job gains result in part because



state and local government infrastructure projects typically leverage additional resources from the federal government and the private sector. Building infrastructure also employs regional or local workers, equipment, and materials to a greater degree than the economic activity that declines (consumption of imported goods, in part) as a result of the taxes used to finance infrastructure projects.

Heintz et al (2009) estimate that infrastructure investment by the federal government produces between 14.5 and 23.7 jobs per million dollars invested, with the range depending on the particular type of infrastructure. The largest employment increases are generated by investments in mass transit systems, while the smallest are from electricity transmission and distribution infrastructure.

Capital projects by state and local governments will yield somewhat smaller increases in employment per dollar of investment because smaller regions are less able to capture the benefits of the investment; for example, states have to buy some materials from neighboring states and some of the workers earnings will be spent in other states. On average – across all types of public infrastructure – investments by state governments in New England will produce 13 jobs in the state per million dollars invested (table 4). These jobs include the “direct” jobs actually involved with the infrastructure project, “indirect” jobs at firms supplying goods and services to the project, and “induced” jobs that result from additional consumer

spending from the increase in direct and indirect employment.

When matched with federal funds, the employment increases can become even more substantial for the state investment. Projects funded through the recent “TIGER” (Transportation Investment Generating Economic Recovery) program through the U.S. Department of Transportation, for example, receive up to four federal dollars for each state dollar invested.<sup>15</sup> This level of matching would generate 52 jobs per million dollars invested by states in New England.

#### THE LONG-TERM IMPACTS ON PRODUCTIVITY, GROWTH, AND EMPLOYMENT

The long-term benefits of infrastructure investment are not only from the jobs created during the construction of the project. Infrastructure investments increase the income and competitiveness of regions by reducing costs faced by firms and workers and creating new opportunities for private-sector investment and job growth. Costs are reduced for workers and firms when people and goods are transported more quickly and at lower costs. Opportunities are created when public investments create access to or revitalize places in ways beyond the capacity of individuals or even large corporations.

Numerous studies in the economics literature have documented how public infrastructure investments increase productivity in the private sector, an essential part of economic growth. The earliest study on this

TABLE 4. EMPLOYMENT GENERATED BY STATE INFRASTRUCTURE INVESTMENT PROJECTS

	Jobs per \$1 million invested				Total jobs per \$1 million in state financing with federal contribution	
	Total jobs	Direct jobs	Indirect jobs	Induced jobs	Federal spending at 80% of total project cost*	Federal spending at 20% of total state and local spending (average for 2004)**
Connecticut	11.6	6.6	1.7	3.3	46.5	14.1
Maine	15.3	8.5	2.4	4.4	61.0	18.5
Massachusetts	12.0	6.7	1.9	3.4	48.2	14.6
New Hampshire	13.4	7.6	2.0	3.8	53.8	16.3
Rhode Island	12.0	7.1	1.5	3.4	48.2	14.6
Vermont	14.8	8.3	2.3	4.2	59.4	18.0

Note: State and local investment includes spending on buildings, roads, computer equipment, etc.

Source: PERI and IMPLAN 2007

\* Based on Federal TIGER Transportation Infrastructure Grants through the Department of Transportation.

\*\* Based on total federal capital project grants and subsidies as a share of total state and local government capital project spending: <http://www.cbo.gov/ftpdocs/85xx/doc8517/08-08-Infrastructure.pdf>.

question, Aschauer (1989) used several decades of data for the U.S. economy and found that public infrastructure investment has a substantial impact on productivity, with a ten percent increase in the public capital stock increasing output in the private sector by 3.3 percent, a much larger return than private investments. These initial findings were controversial and sparked follow-up studies which criticized Aschauer's methods and data. Using techniques to control for other factors that might be influencing economic growth, Holtz-Eakin (1994) and Garcia-Mila et al (1996) found no impact from infrastructure investment.

Since this controversial exchange more than a decade ago, many more studies have explored the economic impacts of infrastructure investment. Using detailed and updated data sets and sophisticated empirical and statistical approaches, this new generation of research has shown that the economic impacts of infrastructure investment are not as large as suggested by Aschauer (1989), but they are positive and economically important.<sup>16</sup> A recent review by Romp and de Haan (2007) finds that the literature has moved toward a consensus that public infrastructure investment has positive impacts on per-capita income and productivity in the private sector.

Among the most prominent of the more recent studies is a series of papers by Catherine Morrison Paul and her colleagues, which shows that public infrastructure investment by states reduces private-sector costs in the manufacturing sector, leading to increased output and employment – in New England as well as most of the rest of the country (Morrison Paul et al, 1996a, 1996b, 2004, 2007). In one study Morrison Paul and Schwartz (1996) found that in the average New England state “increasing the stock of infrastructure by 1% would yield a .475% increase in the demand for production labor and a .419% increase in the demand for non-production labor. Given the ‘average’ state’s 137,700 production workers and 90,000 nonproduction workers, that would represent over 1,000 new jobs for an increase in the public-capital stock of roughly 55 million 1982 dollars.”

In subsequent studies Cohen and Morrison Paul (2007) find that while both airport and highway transportation infrastructure lower private sector costs, only highway infrastructure has large positive impacts on employment, with production employment in New England ris-

ing 0.37 percent for every one percent increase in public highway capital stock. They also find that infrastructure investment of neighboring states also boosts productivity and lowers costs in the manufacturing sector, and that a ten percent increase in infrastructure investment lowers costs in the manufacturing sector by 2.3 percent (Cohen and Morrison Paul, 2004). The impacts of infrastructure investment are also shown to be getting stronger over time.

One improvement of the research on infrastructure is that newer studies have begun relaxing some of the strict assumptions imposed in previous studies. Henderson and Kumbhakar (2006) use “non-parametric” techniques, which do not require assuming knowledge of the production technology used by firms, to study the impact of public infrastructure on productivity and output in the private sector. They find that the standard assumption of linearity in the technological relationship between inputs and output is not benign. Relaxing that assumption and allowing for the possibility of non-linear “production functions” (expressions of the technological relationship between production levels and inputs) they show that in the typical state increasing the stock of public infrastructure by ten percent increases total economic output in the state by 1.2 percent (Henderson and Kumbhakar, 2006, 225).

Other recent studies allow for long-term dynamic feedback effects of infrastructure investment. Earlier studies had examined year-to-year changes in infrastructure and output growth to control unobserved factors at the state level (Holtz-Eakin, 1994). The primary impacts of public infrastructure on private-sector productivity, however, are arguably experienced over the long-run, where past investments and levels of capital stock influence current productivity. Heintz (2010) shows that previous infrastructure investments do have a persistent positive effect on private sector output, a relationship that is obscured when focusing on year-to-year changes.

Haughwout's (2002) study uses a “compensating differentials” approach that exploits regional variation in land values and wages to determine the value of public infrastructure. Using city-level data, he finds that the stock of public capital, including roads, parks, sewer systems, and public buildings, not only raises productivity, but it also has important consumption benefits in a region. An important caveat to Haughwout's findings, however, is that at the margin the costs

outweigh the benefits of additional infrastructure investment. In other words, infrastructure matters, but more of it is not necessarily beneficial. Albouy (2009), however, shows that this caveat is unwarranted. Because Haughwout ignores some of the key determinants of land values, he effectively understates the benefits of infrastructure investment.<sup>17</sup> After including these factors the benefits of public infrastructure investment outweigh the costs, both on average and at the margin. Each additional dollar of state-level public infrastructure generates benefits to businesses and households between \$1.37 and \$0.69, with the lower estimate not statistically different from \$1.00 (Albouy, 2009, 19).

The review by Romp and de Haan (2007) along with the best of the most recent studies on the economics of infrastructure investment (Cohen and Morrison, 2004, 2007; Henderson and Kumbhakar, 2006; Albouy, 2009, and; Heintz, 2010) conclude that public infrastructure investments increase productivity and decrease costs of private sector firms. The impacts are not as large as suggested by Aschauer (1989), instead approximately half as large, but statistically significant and economically important.

#### BETTER INFRASTRUCTURE, NOT JUST MORE INFRASTRUCTURE

Dozens of studies have analyzed the impacts of state-level expansion of transportation infrastructure alone, chiefly highways, on economic activity and employment. In reviewing those studies, Fisher (1997) shows that most found positive and statistically significant results. Many of the studies of the impacts of highway investment, though, also show that some of the growth associated with highways is simply relocation of growth that would have happened elsewhere – a similar critique as levied against many economic development subsidies. The growth in highways may in part attract growth, rather than generate growth. Places building new highways add jobs, businesses and people, but other close-by areas lose jobs, businesses and people. In their review of the literature on the economic impacts of highways, Boarnet and Haughwout (2000) show that growth in highways leads more urban areas to gain jobs at the expense of rural areas, and suburban fringes to gain jobs at the expense of the urban center.

This is the dynamic of urban “sprawl,” which poses a host of environmental and social costs. Some of those costs include increased travel time and air pollution, reductions in wetlands, forests, farmland and open spaces, and the abandonment of inner-city neighborhoods. Other types of public infrastructure, though, generate jobs and economic activity without these costs. Investments in mass transit, for example, reduce carbon emissions and lower the costs of transportation for commuters, shoppers and students. Businesses also benefit from reduced road congestion as well as cost-savings related to employee transportation. Because workers consider travel costs and travel time when deciding where to pursue employment, traffic congestion raises labor costs for firms (Madden, 1985 and Zax, 1991). By raising costs for firms and making areas less attractive to potential in-migrants, congestion has also been found to reduce growth in employment (Hymel, 2008) as well as output (Boarnet, 1997; Fernald, 1999).

All transportation infrastructure is “subsidized,” with motorists and transit riders paying fees that are just a fraction of the costs of constructing and maintain highways and public transportation systems. Increased highway subsidies, though, lead to increases in urban sprawl, while increased transit subsidies keep urban areas more compact (Su and DeSalvo, 2008). Transit investment can prevent sprawl, relieve congestion, and lower costs to households and firms. A number of studies have found that increased density of development in urban areas boosts productivity (Ciccone and Hall, 1996; Haughwout, 2000). By increasing density, public transportation makes an important contribution to that growth (Graham, 2007).

In his review of the literature on the broader economic development impacts of public transportation, Vickers (2008) shows that most studies find benefits of transit investment that extend well beyond the direct “riders” of the buses, trains, and ferries in the system. Public transportation investments increase the value of land and homes near transit facilities and, by increasing density, boost economic growth.

In a 2009 study for the American Public Transportation Association, Weisbrod and Reno estimate that a national investment of \$13 billion in public transportation would double ridership and boost economic activity by \$23.4 billion. They estimate that 400,000 jobs, from the construction and operation of the expanded system

as well as from the reduced costs for firms and households, would be created, slightly more than 30 jobs per million dollars of investment. The benefits of public transportation are not limited to urban areas, either. Burkhart (1999) showed that investments in rural public transit services also have large economic impacts.

Beyond the realm of transportation, there are other infrastructure investments that reduce carbon emissions and fossil fuel consumption while boosting jobs. These investments are described in a series of studies by economists at the Political Economy Research Institute. In *"The Economic Benefits of Investing in Clean Energy,"* Pollin et al (2009) show how a dramatic investment initiative that increases energy efficiency and lowers costs from renewable energy sources such as wind and solar can create millions of jobs. Including jobs lost in fossil fuel production and transportation, a \$150 billion investment would create a net increase of 1.7 million jobs. These clean energy investments are not state or region-specific, but would create nearly 82,000 jobs in New England (table 5).

#### THE REGION'S INFRASTRUCTURE IS IN NEED OF REPAIR

Despite the evidence of the impacts on employment and private-sector productivity, the rate of investment in public sector infrastructure has been declining for decades. Heintz et al (2009) demonstrate how, starting in the late 1970s, growth in infrastructure investments slowed dramatically. America's economy grew rapidly up until that point and has slowed dramatically since. Between 1950 and 1979, average real annual growth in public investment in the U.S. was 4.0 percent and GDP grew 4.1 percent; between 1980 and 2007, public investment grew by 2.3 percent and GDP grew 2.9 percent (Heintz et al, 2009, 7).

TABLE 5. STATE-LEVEL NET JOB EFFECTS OF \$150 BILLION CLEAN-ENERGY INVESTMENT PROGRAM

	Net change in employment from shift from fossil fuels to clean-energy investments
Connecticut	+16,741 jobs
Maine	9,957
Massachusetts	38,410
New Hampshire	7,686
Rhode Island	4,540
Vermont	4,270
New England	81,604
U.S. Total	1,714,000

Source: *"The Economic Benefits of Investing in Clean Energy," PERI 2009.*

The general slow-down in infrastructure investment can be seen at the state-level, and has been marked for the New England states (table 6). Since the mid-1960s, annual growth in the per-capita public capital stock has declined dramatically in all of the New England states. In the 1960s four New England states had above average annual rates of growth in the per-capita stock of public capital, and the remaining two states were growing at rates close to the national average. Between 1996 and 2006 only Massachusetts was increasing its per-capita stock of public capital faster than the national average, and this is largely due to Boston's "Big Dig."

As infrastructure investments have declined, the list of critical infrastructure in need of replacement and repair has grown. Across the region, there are thousands of bridges, dozens of dams, and a large portion of major roads that are in desperate need of upgrading and replacement (table 7, p. 18). In Rhode Island, for example, 68 percent of major roads are in poor or mediocre condition. There are also millions of dollars in needed

TABLE 6. AVERAGE GROWTH RATES OF REAL, PER CAPITA PUBLIC CAPITAL STOCK BY STATE, 1966-2006

	1966-75		1976-85		1986-95		1996-2006	
	% growth	rank	% growth	rank	% growth	rank	% growth	rank
Connecticut	2.5%	36	-0.2%	48	2.1%	4	1.1%	35
Maine	3.3%	20	0.9%	39	1.6%	12	1.0%	41
Massachusetts	4.0%	8	1.5%	20	2.1%	5	2.5%	1
New Hampshire	2.6%	32	0.2%	46	0.4%	42	1.1%	33
Rhode Island	3.3%	21	0.3%	45	2.0%	7	0.7%	46
Vermont	3.4%	19	-0.4%	49	-0.1%	50	0.7%	44
average all states	3.1%		1.3%		1.1%		1.3%	

Source: Heintz et al, 2009, Table A-3.

TABLE 7.  
INFRASTRUCTURE  
NEEDS IN NEW  
ENGLAND

	US total	New England	CT	ME	MA	NH	RI	VT
<b>Bridges</b>								
Number of bridges	601,411	17,441	4,180	2,392	5,042	2,371	741	2,715
Structurally deficient bridges (% of all bridges) <sup>1</sup>	12%	14%	9%	14%	12%	16%	22%	18%
Functionally obsolete bridges (% of all bridges)	13%	26%	25%	19%	39%	16%	31%	17%
Bridges that are structurally deficient or functionally obsolete (USDOT)	25%	40%	34%	33%	51%	32%	54%	36%
<b>Dams</b>								
Total state-determined deficient dams (ASDSO) <sup>2</sup>	4,095	327	3	13	246	57	2	6
% of deficient dams that are high or significant-hazard potential	72%	89%	67%	100%	100%	40%	100%	83%
<b>Roads</b>								
Major roads in poor or mediocre condition (ASCE) <sup>3</sup>	-	27% to 68%	47%	29%	41%	27%	68%	40%
<b>Drinking water</b>								
Drinking water infrastructure: 20-year investment need (millions of dollars) (EPA) <sup>4</sup>	\$324,981	\$12,076	\$1,394	\$956	\$6,790	\$1,495	\$768	\$673

Sources:

1. U.S. Dept. of Transportation, Federal Highway Administration, Deficient Bridge report:

<http://www.fhwa.dot.gov/Bridge/deficient.cfm>.

2. Association of State Dam Safety Officials:

[http://www.damsafety.org/media/Documents/STATE\\_INFO/STATISTICS/2007StateProgramStatistics.pdf](http://www.damsafety.org/media/Documents/STATE_INFO/STATISTICS/2007StateProgramStatistics.pdf)

3. American Society of Civil Engineers, 2009 Report Card for America's Infrastructure:

[http://www.infrastructurereportcard.org/sites/default/files/RC2009\\_full\\_report.pdf](http://www.infrastructurereportcard.org/sites/default/files/RC2009_full_report.pdf)

4. U.S. Environmental Protection Agency, 2007 Drinking Water Infrastructure Needs Survey and Assessment:

[http://www.epa.gov/ogwdw000/needssurvey/pdfs/2007/report\\_needssurvey\\_2007.pdf](http://www.epa.gov/ogwdw000/needssurvey/pdfs/2007/report_needssurvey_2007.pdf)

improvements to the region's drinking water infrastructure in coming years. Many of the available measures of infrastructure investment shortfalls suggest greater level of need in New England than in most of the rest of the country.

Other vital areas also face pressing needs, but do not have readily available state-level data. Current levels of investments fall more than \$3 billion short of what is required to simply maintain the nation's existing mass transit systems (Heintz et al, 2009). To similarly maintain the locks and levees on the nation's waterways will require an additional \$6.2 billion annually, and the nation's school buildings need \$4.7 billion more annually.

Addressing these needs represents an opportunity to generate employment in the short-term, as New England slowly recovers from the Great Recession, as well as build a stronger foundation for economic growth for decades to come.

### Developing the skills of the current and future workforce

For most industries labor represents the single-largest cost. For most households the majority of their income is from labor earnings. The education and skills of the workforce play a hugely important role in determining the productivity of firms and the earnings of working

household. The vast majority of the education and training received by most workers at most firms is delivered by the public sector, including elementary and high schools, community and technical colleges, state colleges and universities, and federal training programs. Across the country, there are 99,000 public elementary and high schools, providing instruction for 50 million students, and 2,000 public colleges and universities educating 13.6 million students.<sup>18</sup> Public institutions provide the education for 89 percent of pre-K through 12th grade students, and 74 percent of college students nationally.<sup>19</sup> Training programs funded by the Department of Labor Workforce Investment Act reach nearly 6 million low-skilled adults and “dislocated” workers.<sup>20</sup>

Education and training help individual students and workers by increasing their skills and giving them opportunities to achieve higher earnings. Individual companies benefit by having more productive workers who are able to learn quickly and adjust to changing economic conditions. Education and training also can generate broader gains for states and regions. The available evidence suggests that investments in education at all levels – from preschool to training of incumbent workers – generates economic growth and increases employment. The current education system, however, is inadequate to meet the needs of New England’s workers or employers. Early childhood education and higher education in New England are funded at levels well below the national average. While New England generally has quality elementary and secondary schools, dropout rates and test scores in the K-12 system suggest there remains considerable room for improvement.

#### THE SHORT-TERM IMPACT ON JOBS

In the short-run, spending on education is effective at generating jobs in part because it is such a labor-intensive sector. Most education spending by state and local governments goes directly to pay the salaries of the teachers, teachers-aids, professors and other professions involved in the work of teaching students. Each million dollars of spending on education (averaged across K-12 and higher education) in New England creates 28 jobs (table 8). Spending on early childhood education, including preschool, Head Start, and day care centers, creates even more jobs – 35 jobs per million dollars of spending in New England – since that sector is even more labor-intensive and has lower earnings. If increases in education spending are fi-

nanced in a progressive fashion, raising taxes most for higher-income households, then additional spending can be expected to generate a sizeable net increase in jobs. The decline in consumer spending from raising taxes on affluent households in New England can be expected to offset less than one-fifth of the growth in jobs resulting from increased spending on education and early childhood programs.<sup>21</sup>

TABLE 8. JOBS PER \$1 MILLION IN SPENDING ON EDUCATION AND TAXES TO FINANCE EDUCATION SPENDING

	CT	MA	ME	NH	RI	VT
Education spending						
Total jobs	25.5	27.0	31.5	27.0	26.3	30.8
direct	16.2	17.2	19.8	17.1	17.0	19.2
indirect	2.0	2.1	2.7	2.2	1.8	2.8
induced	7.3	7.7	9.0	7.7	7.5	8.8
Early childhood spending						
Total Jobs	33.3	30.0	38.4	37.1	33.2	38.8
direct	21.9	19.4	24.8	24.2	21.7	24.9
indirect	1.9	2.0	2.6	2.3	2.0	2.8
induced	9.5	8.6	11.0	10.6	9.5	11.1
Total jobs lost per \$1 million increase in income taxes paid by affluent households (\$150k+)*						
	CT	MA	ME	NH	RI	VT
	4.7	5.1	6.2	5.7	5.1	6.0

Notes: Education spending includes primary, secondary, college/university, and other (such as trade schools). Early childhood spending includes daycare centers, home care, headstart, preschool, and other child care \*For households >\$150k, fall in personal consumption is 50% of total tax increase. See Thompson and Garrett-Peltier (2010) for details. Source: PERI and IMPLAN 2007.

#### LONG-TERM ECONOMIC IMPACTS OF EDUCATION SPENDING

Numerous studies on the long-term economic impacts of spending on education show that it can boost employment and incomes in a state or region. Wasylenko and McGuire (1985) and Dalenberg and Partridge (1995) show that education spending by states and regions increases employment. Garcia-Mila and McGuire (1992) show that education spending by states raises Gross State Product, while Tannenwald and Kendrick (1995) show that it boosts private-sector capital spending, and Helms (1985) finds that it raises personal income in the state. In a 1997 review of this literature, Fischer concludes that while most research (over half of the studies reviewed) finds positive effects

from state and local government education spending, limitations of the studies, including data quality and concerns over the direction of causality, should make readers cautious about making claims on the size of impacts. Subsequent research has adopted improved data and methods, and continues to show positive effects from education spending. Gottlieb and Fogarty (2003) find that regional differences in educational attainment in 1980 were a significant driver of income and employment growth in the following two decades. Bensi et al (2004) demonstrate that increases in state education spending, relative to the national average, precede increases in personal income in the state. Morretti (2003) finds that there are substantial “social returns” to higher education, with the wages of workers of all education levels rising as a result of increases in the share of a city’s workforce that is college-educated.

In addition to training the future workforce, institutions of higher learning are increasingly engaged in local and regional efforts to help local firms and industries innovate. The influence of quality elementary and secondary education in attracting skilled people to places is now widely recognized. Parents, particularly those with high levels of education, will move to a city or town for its high-quality K-12 education system. Colleges and universities also attract students and faculty, and the cultural and commercial amenities associated with college environments – restaurants, shops, and bookstores – draw still broader groups of people to an area.

A whole host of studies have reviewed the impacts of different parts of the broader education system. The evidence suggests considerable payoff from reform efforts to improve the quality of public high schools, implementation of high-quality early childhood education programs, and programs that work with employers to train the current workforce.

#### *Impacts of K-12 education reforms*

Recent studies suggest that experimental educational reform initiatives hold great promise for improving educational outcomes and generating broader social benefits. Levin et al (2006) reviewed research on several reform efforts and found that benefits to society, in the form of reduced unemployment, crime and welfare use, and increased tax collections, generally exceed the costs of the programs.<sup>22</sup> The STAR elementary school class-size experiment, which reduced class sizes from 25 to 15 students, boosted eventual high school

graduation rates and produced social benefits, in the form of increases in tax collections and reduced public spending on crime and welfare and health care programs, which exceeded the cost of the program by nearly \$66,000 per student (reflecting the net-present value measured over a 20-year period.)<sup>23</sup>

The First-Things-First (FTF) high school reform initiative includes smaller “learning communities,” dedicated teachers who stay with the students for several years, improved instructional efforts, and family advocates. FTF increased graduation rates, improved math and reading test scores, and generated social benefits \$150,000 greater than the cost per-student (net present value over 20 years).<sup>24</sup> These cost-benefit figures are conservative in that they do not include the increases in earnings that accrue to the individual graduates. A similar comprehensive reform effort, “Career Academies” (the main difference being the added focus on career themes and work-based learning opportunities through local employers) has been shown to substantially boost earnings (Stern et al, 2010). Eight years after graduating, young men had 17 percent higher earnings than their counterparts in an experimental control group (Kemple and Willner, 2008). Average annual earnings gains for participants were \$2,200, considerably higher than the \$687 annual per-student cost of the program.

#### *Early childhood education*

Investments in early childhood education can also have large impacts on employment and income. Detailed longitudinal studies of low-income students in the High-Scope Perry Preschool program and the Chicago Child-Parent Center found that these programs achieved dramatic results, including increased high school graduation, higher rates of employment, higher wages, and lower rates of incarceration, which far exceed the costs (Schweinhart et al, 2005, Barnett, 1996).

Results for these experimental programs have implications for broad-based investments in high-quality preschool education. Bartik’s (2006) analysis of the findings from these programs suggests the economic payoff – in terms of increased earnings and employment in a state – from a universal preschool program would be substantial. As soon as preschool participants begin to graduate from high-school (after 17 years), the impacts become quite large and quickly exceed the impacts that can be expected from economic de-

TABLE 9. STATE-BY-STATE ESTIMATES OF LONG-RUN EFFECTS  
OF UNIVERSAL PRESCHOOL AND TAX INCENTIVES, NATIONAL VS.  
STATE PERSPECTIVE

	Jobs				Annual earnings (millions of 2004\$)				Additional annual cost of universal pre- school or equivalent tax incentives (millions of 2004 dollars)
	State perspective (only one state adopting the policy)		National perspective (all states adopting the policy)		State perspective (only one state adopting the policy)		National perspective (all states adopting the policy)		
	Pre-school	Tax incentives	Pre-school	Tax incentives	Pre-school	Tax incentives	Pre-school	Tax incentives	
Connecticut	22,425	10,483	31,814	2,209	1,054.4	899.0	1,525.1	188.5	235.8
Maine	8,396	3,880	11,735	815	249.8	210.3	355.7	44.0	55
Massachusetts	43,860	20,285	61,376	4,261	1,979.3	1,667.9	2,821.3	348.7	436.2
New Hampshire	8,051	3,909	11,989	832	289.9	257.7	441.5	54.6	68.3
Rhode Island	6,252	3,056	9,387	652	216.6	193.9	332.8	41.1	51.5
Vermont	3,875	1,919	5,915	411	117.8	107.0	184.3	22.8	28.5
New England	92,859	43,532	132,216	9,180	3,908	3,336	5,661	700	875
United States	1,882,870	847,995	2,546,076	176,779	68,949.2	56,472.7	94,838.7	11,721.8	14,662.2

Source: Bartik, 2006, Tables 21, 23 and 24

Notes: These are long-run estimated effects, based on present size of state economy, if universal preschool program or traditional economic development subsidy had been running for 75 years. The national perspective figures simply produce the equivalent numbers in a model in which out-migration from the state is assumed to be zero—equivalent to including the effects of out-migration even after they leave a state. The traditional economic development subsidy program is sized so its annual costs are equal in size to the annual costs in that state of a universal preschool program. As outlined in the text, the national perspective figures simply produce the equivalent numbers in a model in which national effects are assumed to be 19.3% of the state effects that would occur if out-migration from the state is assumed to be zero. This adjusts for the lesser effect on subsidies in changing business activity decisions versus business location decisions.

velopment tax incentives and subsidies. If all states adopted universal preschool programs, the long-term increase in national employment would be 2.3 million jobs.<sup>25</sup> On the other hand, if all states adopted comparably costly permanent economic development subsidies, the net employment impacts would be just 177,000 jobs.

While the costs of implementing universal preschool vary depending on a state's size, labor costs and level of pre-existing preschool funding, ranging from \$55 million in Maine to \$436 million in Massachusetts, the payoff is considerable across New England (table 9). The impacts in Connecticut, for example, of adopting universal preschool, along with all other states, would be to generate nearly 32,000 jobs per year over the long-term, compared to just 2,200 jobs from pursuing tax incentives and subsidies. The employment increases from universal preschool range from nearly 6,000 per year in Vermont to more than 60,000 in Massachusetts, while gains from tax incentives are less than 4,300 even in the largest New England state.

The gulf between the long-term employment impacts of universal preschool and the tax incentives approach in part reflects the fact that states benefit from their

neighbors improving education standards but are harmed by their neighbors pursuing tax incentives. Benefits of preschool investment are shared across states when people move. The benefits from tax incentives in one state, on the other hand, represent a loss to neighboring states, as jobs lured to one state are job losses to another. Even ignoring these real world impacts of the actions of neighboring states, however, the payoff remains substantially larger from pursuing universal preschool. If no other states altered their policies, implementing universal preschool in Connecticut would create more than 22,000 jobs annually over the long-term, compared to just 10,000 from an equally-costly economic development subsidy.

#### Higher education

Regions with greater concentrations of highly educated workers are wealthier and have experienced considerably faster economic growth in recent decades (Glaeser and Saiz, 2004). In educating these highly-skilled workers, universities and colleges play a crucial role in generating economic growth. There is an important distinction, however, between educating college students and increasing the level of skills and "human capital" in a state. Because of their very high rates of geographic



mobility, a large share of college graduates will not remain in the state – let alone the city – where they attend college. Nine years after graduating nearly 40 percent of graduates lived a different state than where they attended college (Kodryzcki, 2001). Bartik and Erickcek (2008) estimate that a 50 percent increase in the size of a metropolitan area's higher education sector will, over the long-term, increase the share of college graduates in the area's workforce by 1.6 percent.

Boosting the number of graduates does not appear to be the primary way that universities work to increase a region's human capital (Abel and Deitz, 2009). Instead, the research and development activities pursued in the university create jobs for and attract highly skilled workers. Abel and Deitz (2009) find that greater numbers of degrees "produced" by a region's universities has only a weak positive relationship with the skills of workers in that region; research activity, though, has a strong relationship, with particularly large impacts on the numbers of workers in highly-skilled occupations.

The economic growth emerging from the interaction of universities and high-tech firms in North Carolina's Research Triangle, California's Silicon Valley, and Boston's 128 Corridor are well known. The influence of university research and development activities on private-sector innovation and growth, though, is not limited to these high profile examples. University R&D activity has been found to influence the number of patents and other measures of innovation of private sector firms in the region (Acs et al, 1992, Feldman and Florida, 1994, and Anselin et al, 1997). It has also been shown to influence the location decisions of high-tech firms (Woodward, et al, 2006; Audretsch, et al, 2005), "start-ups" of new companies in a variety of industries (Zucker, et al, 1998; Sorenson and Audia, 2000; Stuart and Sorenson, 2003), and additional research and development activity in the private sector (Audretsch and Feldman, 1996; Hall et al, 2003).

While the large number of students who leave the region where they attend college constrains the ability of universities to increase an area's human capital, it also suggests another way that colleges boost a region's economy. Educating students from other states and regions is essentially an exported service. The students who come to a college town increase the demand for a whole range of goods and services. Bartik and Erickcek (2008) estimate that, largely because schools attract students from other places, expanding higher educa-

tion employment by one percent of a metro area's total employment raises average earnings of the local workforce by 0.2 percent.

### *Community colleges and workforce development*

Attending community college and completing an associate's degree has been shown to significantly boost student's earnings (Kane and Rouse, 1995; Leigh and Gill, 1997). Community colleges are also increasingly serving students who are not enrolled for credit, including those engaged in training programs funded through the Department of Labor (the Workforce Investment Act) and "incumbent workers" participating in customized training programs developed jointly with employers (Van Noy and Jacobs, 2009). The nations' 1,150 community colleges serve 6.5 million students on credit programs, and approximately 5 million in non-credit continuing education (BRT, 2009).

These training efforts are quite diverse, but some evaluation evidence suggests that the impact on employment and earnings is considerable – much higher than from the traditional subsidy approach. Reviewing the research on customized job training, Bartik (2009) concludes that customized job training is more than ten times as effective in creating jobs as tax incentives. Hollenbeck's (2008) review of the program in Massachusetts finds that training grants created several thousand jobs in export industries, at a cost of less than \$9,000 per job. Workers, firms, and the state all benefitted as the program increased earnings, retained jobs, raised profits and generated additional tax revenue (Hollenbeck, 2008, 18).

A recent evaluation of the impacts of the Workforce Investment Act (WIA) suggests that the broader array of training initiatives involving community colleges is also raising skill levels and increasing wages. Using a non-experimental technique matching training recipients with observationally equivalent non-participants, researchers at IMPAQ International analyzed the labor market experiences of 160,000 WIA participants in twelve states (including Connecticut) from 2003-2005 and found significant impacts on earnings and employment that persisted for the entire four-year post-training evaluation period (Heinrich et al, 2008).

For participants receiving the basic "core" or "intensive" WIA services, the earnings gains were between \$100 and \$200 per quarter, relative to non-participants, considerably higher than the very low

costs of delivering these services. For participants receiving additional services, namely occupational or vocational training, the earnings impacts were even greater. By the end of the fourth year following completion of the training program, participants were making an average of \$400 per quarter more than comparable workers who had not received training.

#### Manufacturing extension services

Following the same basic model as the agricultural program, manufacturing extension services provide consulting and technical advice to small or medium-sized manufacturing firms, and are delivered by federally-funded state extension centers, often in collaboration with universities and community colleges. Existing evaluations suggest that each dollar spent on manufacturing extension services can reduce business costs by over three dollars (Bartik, 2009; Ehlen, 2001; Jarmin, 1999). A review of extension centers in Illinois found

that they led to the creation and retention of more than 900 jobs, hundreds of millions of dollars in increased sales, and nearly \$10 million in additional state and local taxes, compared to the \$6 million two-year cost of the program (Ehlen, 2001.) Analyzing a large longitudinal dataset of firms participating in extension programs, Jarmin (1999) found that the services increased labor productivity between 3 and 16 percent compared to a comparison group of firms not participating.

#### EDUCATION FINANCING AND OUTCOMES IN NEW ENGLAND

The resources and performance of education systems in New England are mixed. Investments in public higher education are quite low compared to most of the country. Public preschool programs remain nascent, with little funding and limited access. Elementary and secondary schools in New England, on the other hand, are generally well-funded and have above-average test scores and graduation rates. Dropouts and academic performance, though, remain important areas for improvement.

TABLE 10. PUBLIC K-12 CURRENT EXPENDITURES PER PUPIL, BY FUNCTION: FISCAL YEAR 2008 (NCES) (ADJUSTED FOR CROSS-STATE DIFFERENCES IN THE COST OF PROVIDING EDUCATION)

	Total expenditures <sup>1</sup>	rank	Instruction & related <sup>2</sup>	rank	Student support services <sup>3</sup>	rank	Administration <sup>4</sup>	rank	Operations <sup>5</sup>	rank
United States <sup>6</sup>	\$10,297		\$6,778		\$556		\$1,109		\$1,854	
New Jersey	14,178	1	8,889	3	1,341	2	1,352	7	2,596	2
New York	14,091	2	10,105	1	466	33	1,229	12	2,291	8
Wyoming	13,823	3	9,053	2	804	8	1,538	1	2,428	6
Vermont	12,595	6	8,412	6	923	6	1,447	4	1,813	30
Rhode Island	12,221	7	7,984	7	1,446	1	993	32	1,798	31
Connecticut	11,695	9	7,708	8	711	11	1,186	15	2,091	10
Massachusetts	10,732	14	7,477	9	600	17	918	44	1,737	35
Maine	10,599	17	7,241	12	478	31	950	40	1,930	17
New Hampshire	10,094	22	6,821	19	692	12	981	35	1,600	39
Nevada	7,604	48	4,911	47	356	47	936	41	1,401	45
Idaho	6,977	49	4,541	48	397	44	702	49	1,337	46
Utah	5,575	50	3,862	50	205	50	514	50	993	50

Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey (NPEFS)," fiscal year 2008, Version 1a.

Note: Expenditures adjusted for cross-state differences in cost of living with Berry Index. See Berry et al (2000), updated index available at <http://mailer.fsu.edu/~wberry/garnet-wberry/index.html>.

1. Include instruction, instruction-related, support services, and other elementary/secondary current expenditures, but exclude expenditures on capital outlay, other programs, and interest on long-term debt.

2. Include current expenditures for classroom instruction (including teachers and teaching assistants), libraries, in-service teacher training, curriculum development, student assessment, and instruction technology.

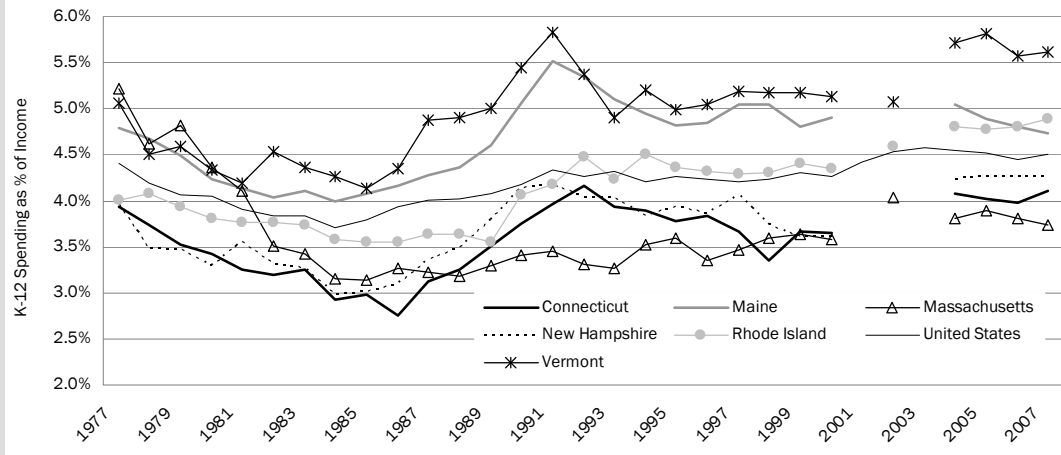
3. Include attendance and social work, guidance, health, psychological services, speech pathology, audiology, and other student support services.

4. Include general administration, school administration, and other support services.

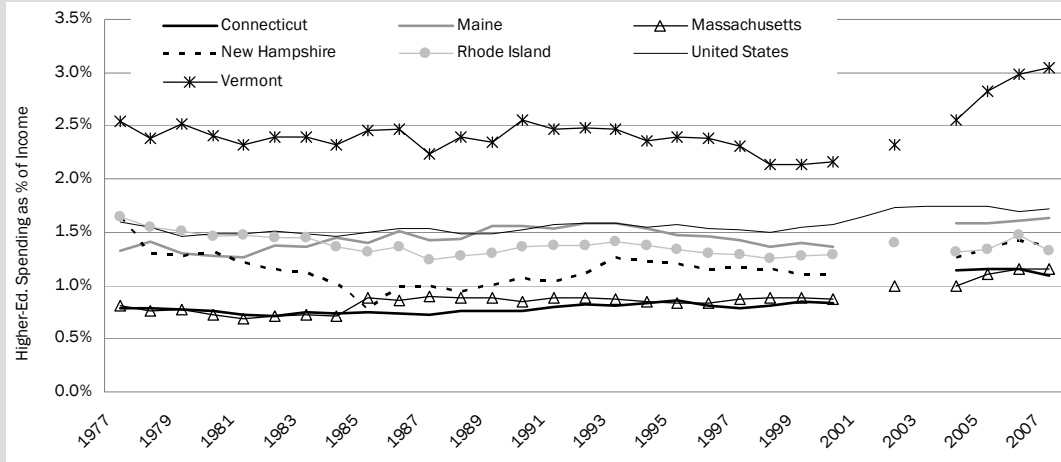
5. Include operations and maintenance, student transportation, food services, and enterprise operations.

FIGURE 5. EDUCATION SPENDING AS SHARE OF PERSONAL INCOME

PANEL A. ELEMENTARY EDUCATION SPENDING BY STATE & LOCAL GOVERNMENT IN NEW ENGLAND AS % OF PERSONAL INCOME



PANEL B. HIGHER EDUCATION SPENDING BY STATE & LOCAL GOVERNMENT IN NEW ENGLAND AS % OF PERSONAL INCOME



Source: PERI analysis of Census state and local government finance data.

### K-12 education financing and outcomes

Compared to many other parts of the country, the public K-12 education systems in New England are strong. Spending per-student, test scores, and graduation rates are all above the national average. Considerable room for improvement remains, however, with tens of thousands of students dropping out every year and many more with inadequate reading and math skills.

Education spending in New England is relatively high in part because of the high cost of living and salaries paid to college-educated workers in all industries. Even after adjusting for these cost differences, however, most of the New England states spend more per-pupil than the national average.<sup>26</sup> Including all types of current expenditures, Vermont spends \$2,300 more per-pupil than the national average and Massachusetts \$400 more (table 10, p. 23).<sup>27</sup> New Hampshire is the only New England state spending below the national average. The main area where New England spends more

than the national average is for instruction, which represents two-thirds of all expenditures. All of the New England states spend more than the national average and rank high for spending on instruction. For administration and operations spending, however, most New England states are ranked in the bottom half of states.

Looking at total K-12 spending by state and local government as a share of personal income, spending is higher than the national average in three New England states (ME, RI, VT) and lower in three (CT, MA, NH) (Figure 5).

Test scores and freshman completion rates from high school are generally higher in New England than the national average, but there are still large numbers of students performing at low levels and failing to complete high school. One state, Rhode Island, has lower than national average reading and math scores on 8th grade NAEP tests, with 32 percent of students falling below basic standards in math and 28 percent in read-

TABLE 11. MATH AND READING  
ATTAINMENT LEVELS OF 8TH-GRADE  
PUBLIC SCHOOL STUDENTS: 2009  
(NCES)

	Percent attaining mathematics achievement levels				Percent attaining reading achievement levels			
	Below basic	At or above basic	At or above proficient	At advanced	Below basic	At or above basic	At or above proficient	At advanced
United States	29	71	33	7	26	74	30	2
Connecticut	22	78	40	10	19	81	43	5
Maine	22	78	35	8	20	80	35	3
Massachusetts	15	85	52	17	17	83	42	5
New Hampshire	18	82	43	11	19	81	39	4
Rhode Island	32	68	28	6	28	72	28	2
Vermont	19	81	43	13	16	84	40	3
New England average*	21	79	40	11	20	80	38	4

\*unweighted average of New England states

Note: Excludes persons not enrolled in school and those who were unable to be tested due to limited proficiency in English or due to a disability. Data include students for whom accommodations were permitted. Detail may not sum to totals because of rounding. Standard errors appear in parentheses.

Source: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress (NAEP) 2009 Mathematics Assessments, retrieved November 18, 2009, from the Main NAEP Data Explorer (<http://nces.ed.gov/nationsreportcard/naepdata/>).

ing (table 11). In Connecticut and Maine 22 percent of 8th graders had below basic math skills in 2009, compared to 29 percent nationally. The share of Massachusetts 8th graders with “advanced” math skills was 17 percent, compared to 7 percent nationwide. Similar patterns are observed in NAEP 8th grade reading scores. Connecticut and New Hampshire each had 19 percent of students falling below basic reading skills, and 20 percent were below basic in Maine. In Vermont only 16 percent of 8th graders had below basic reading skills, compared to 26 percent nationally.

Based on the share of incoming high school freshman who ultimately graduate from high school, Maine and Rhode Island have the lowest completion rates among the New England states and rank 19th and 26th nationally, respectively, with completion rates just above 76 percent (table 12, p. 26). Vermont has the highest completion rate in New England, at 89.3 percent in 2007-08, second highest among states. These completion rates are higher than the national average of 74.9, but leave tens of thousands of additional students in the region every year without even a high school degree. Nearly 23,000 students dropped out of high school in New England in 2007-08. Two New England states, Rhode Island and Maine, have dropout rates

higher than the national average. Massachusetts and New Hampshire are both in the middle of the distribution of states, ranking 32nd and 35th among states for dropout rates.

#### *Higher education financing and affordability*

Most New England states spend far less than the national average for higher education. After adjusting for cross-state differences in the cost of providing higher education services and the mix of different types of education provided, five of six New England states have per-student appropriations below the national average (table 13, p. 26). Higher education appropriations in Vermont were more than \$4,200 per student below the national average. In recent years higher education spending has declined in real terms (after adjusting for the rising cost of education) with most New England states falling even further behind the rest of the country. Between 2004 and 2009, per-student appropriations grew four percent nationally and were flat in Connecticut and Maine, but fell in the other New England states, including double digit declines for Massachusetts, Rhode Island and Vermont.

As a share of state personal income, only Vermont spends more (including appropriations as well as tuition

TABLE 12. HIGH SCHOOL COMPLETIONS AND DROPOUTS IN NEW ENGLAND: 2007-08

	Freshman completion rate		Dropouts (9th to 12th grade)		rank
	rate	rank	#	rate	
United States	74.9		613,379	4.1	
Connecticut	82.2	12	4,906	2.8	37
Maine	79.1	19	2,642	4.4	21
Massachusetts	81.5	14	9,957	3.4	32
New Hampshire	83.4	9	1,987	3	35
Rhode Island	76.4	26	2,559	5.3	10
Vermont*	89.3	2	839	2.6	42
New England**	81.7		22,890	3.4	

Source: *Public School Graduates and Dropouts from the Common Core of Data: School Year 2007-08* (NCES 2010341): <http://nces.ed.gov/pubs2010/2010341.pdf>.

\* Vermont dropout data are not available for 2007-08 and are based on 2005 figures.

\*\* New England completion and dropout rates calculated by PERI using NCES data for individual states.

Note: The freshman graduation rate provides an estimate of the percentage of students who receive a regular diploma within 4 years of entering 9th grade. The rate uses student enrollment data to estimate the size of an incoming freshman class and counts of the number of diplomas awarded 4 years later.

Note: Event dropout rates measure the percentage of public school students in grades 9 - 12 who dropped out of school between one October and the next. Dropouts were enrolled in the previous school year, but not the current school year, and have not graduated, died, or transferred to another school.

and other resources) on higher education than the national average (figure 5, p. 24). One reason behind relatively weak funding of public higher education is likely the location of so many top-tier private colleges and universities in the region. These institutions are obviously a great asset to and strength of New England. To the extent that training incumbent workers and helping regional firms innovate and adopt new technologies is a greater strength at public institutions, and lower-income students are more able to afford an adequately financed public system, an under-developed public

higher education system will hamper economic development in the region.

Declining resources from the public sector are making higher education even less affordable in New England. Rising tuition, declining student aid, and increased reliance on loans were already making higher education more costly for students in all states before the onset of the Great Recession (IHEP, 2006). Since 2007 the situation has deteriorated even further. The New England states have higher cost-adjusted tuition per-FTE

TABLE 13. PUBLIC HIGHER EDUCATION APPROPRIATIONS AND TUITION IN NEW ENGLAND

	Total state and local government appropriations per FTE			Tuition revenue		
		Percent change		Per-FTE	Percent change	Share of total higher education revenue
	FY 2009	FY '91 to FY '04	FY '04 to FY'09	FY 2009	FY '04 to FY'09	FY'09
Connecticut	\$8,317	-8%	0%	\$5,657	8%	40%
Maine	\$6,756	-21%	1%	\$7,496	35%	53%
Massachusetts	\$5,591	0%	-13%	\$4,522	18%	45%
New Hampshire	\$3,131	-15%	-6%	\$7,619	42%	71%
Rhode Island	\$4,763	9%	-29%	\$8,798	35%	65%
Vermont	\$2,654	-42%	-15%	\$12,025	23%	84%
United States	\$6,928	-12%	4%	\$4,108	17%	37%

Note: Figures are from SHEEO, SHEF reports for 2009 and 2004. SHEEO figures are in constant dollar figures which adjust for both costs of providing higher education and also reflect the enrollment mix across different levels of education.

than the national average, and all but Connecticut have implemented larger increases in tuition than the national average between 2004 and 2009 (table 13, p. 26).<sup>28</sup> Vermont's exceedingly high reliance on tuition, three times the national average per-student, explains how it can be among the lowest states in the country for appropriations yet have above average total expenditures.

Insufficient investment in public higher education is hardly limited to New England, and it has implications that extend well beyond the accessibility of education to kids from middle and lower-income households. While other countries have devoted increased resources to research at their universities, research activity has declined at American universities. Adams (2009) identifies a "slowdown in research output during the 1990s in the U.S.," and finds that it is "due largely to a deceleration in the growth rate of resources in U.S. public universities."

#### *Early childhood programs*

Public preschool programs are much less developed than the K-12 and higher education systems, and are funded at much lower levels. As of 2009, Rhode Island and New Hampshire did not have state-wide public preschool programs. In this area, according to the National Institute for Early Education Research (NIEER), Vermont is a leader, enrolling 53 percent of 4-year olds state-wide in its program in 2008-09, twice the national average enrollment levels and more than twice as high as the other New England states with preschool programs (table 14). Financing in Vermont, though, is below average at less than \$3,500 in spending per-participant. According to NIEER, the only New England state devoting sufficient resources per-participant to achieve quality preschool program benchmarks is Connecticut. Connecticut is one of 16 states to achieve NIEER quality benchmarks, and spent \$8,100 per-participant in 2008-09.

TABLE 14. PRESCHOOL ACCESS AND SPENDING IN NEW ENGLAND: 2009 (NIEER)

PANEL A. PERCENT (AND RANK) OF CHILDREN ENROLLED IN STATE PREKINDERGARTEN

	4-year-old		3-year-old	
	Percent	rank (of 38)	Percent	rank (of 25)
Connecticut	11%	28	8%	6
Maine	19%	22	none	-
Massachusetts	11%	27	3%	16
New Hampshire	no program	-	no program	-
Rhode Island	no program	-	no program	-
Vermont	53%	4	17%	2
U.S. Average	25%		4%	

PANEL B. PER PARTICIPATING CHILD SPENDING (AND RANK) FOR STATE PRE-K PROGRAMS

	All reported funding sources		State funding only	
	Per-participant spending	rank (of 38)	Per-participant spending	rank (of 25)
Connecticut	\$10,303	2	\$8,144	3
Maine	\$2,901	35	\$1,507	38
Massachusetts	\$5,994	14	\$5,994	8
New Hampshire	no program	-	no program	-
Rhode Island	no program	-	no program	-
Vermont	\$3,467	29	\$3,467	25
U.S. Average	\$4,711		\$4,143	

Source: Barnett, W. S., Epstein, D. J., Friedman, A. H., Sansanelli, R. A., & Husted, J. T. (2009) *The state of preschool 2009: State preschool yearbook*. New Brunswick, NJ: National Institute for Early Education Research, Rutgers University.  
<http://nieer.org/yearbook/compare/>

## V. FINANCING PUBLIC INVESTMENTS IN THE FACE OF DECLINING BUDGETS

Regardless of the evidence of their impact on economic activity and employment, expanding investments for infrastructure or educational programs requires additional resources. But, as economic activity declined and jobs were lost in 2008 and 2009, state revenues also declined. The crisis in the housing market, with falling home prices and rising foreclosures, even caused the typically stable property tax revenues collected by local governments to fall in some areas. Faced with falling revenue and rising demand for services, states have struggled through massive budget shortfalls in FY09 and FY10. The Center on Budget and Policy Priorities has documented state budget shortfalls averaging 15.2 percent of general fund revenue in FY09 and 30.2 percent in FY10 (table 15).<sup>29</sup>

Looking forward to FY11, most states – as of May 2010 – are expected to experience further budget shortfalls. Nationally, the average shortfall is expected to rise to 29.4 percent (McNichol and Johnson, 2010). Half of the states in New England anticipate smaller shortfalls than for FY10, notably Massachusetts (8.5 percent) and Rhode Island (13.2 percent). Projected shortfalls in New England range from \$337 million in Vermont to \$5.1 billion in Connecticut.

Combining data from state budget responses to previous recessions and forecasts of growth in 2010 and later years, the Rockefeller Institute projects that it will take state governments years to recover from the Great Recession (figure 6, p. 29). It took state budgets three years to recover following the early 1980s recession,

and nearly five years after the recessions in 1990 and 2001. It will take states six years or possibly much longer to recover from the current downturn.

Given existing levels of taxes, states will not have the resources to continue funding programs at current levels, let alone implement economic development initiatives or new programs to help alleviate hardships of the unemployed. States will be forced to generate new revenues and prioritize how they are spending their current resources.

### Additional tax revenues

Many states have already taken action to raise taxes. The National Association of State Budget Officers (NASBO, 2010) reported that revenue-increasing actions by the states raised an additional \$23.9 billion in taxes in FY10. Massachusetts and New Hampshire are two of the ten states nationwide to have adopted “significant” tax increases, according to the Center on Budget and Policy Priorities, having boosted revenues by more than five percent of prior year’s collections (Johnson et al, 2010). Massachusetts adopted corporate income tax reforms and increased the sales tax rate, while New Hampshire broadened the base of its tax on interest and dividend income. The other New England state also acted to raise taxes, implementing changes to their sales, personal income and business income taxes.<sup>30</sup>

These increases will result in lower consumer spending by households paying higher taxes, but overall can be

TABLE 15. RECENT AND FORECASTED BUDGET GAPS

	CT	ME	MA	NH	RI	VT	US
FY2009							
Combined gap* as % of FY09 general fund	15.5%	8.6%	18.5%	8.0%	26.6%	11.6%	15.2%
FY2010							
Combined gap as % of FY10 general fund	27.0%	27.6%	17.7%	27.5%	33.0%	28.1%	30.2%
FY2011: projected							
size of shortfall (millions)	\$5,100	\$940	\$2,700	\$365	\$395	\$338	\$180,000
as % of FY10 general fund	29.2%	32.1%	8.5%	23.4%	13.2%	31.1%	29.4%

Source: CBPP “Recession Continues to Batter State Budgets,” May 24, 2010, Tables 2, 3, and 4 and Figure 2.

\* Combined gap includes both shortfall identified at the start of the budget year and shortfall that develop mid-year if tax revenues fall below anticipated levels.

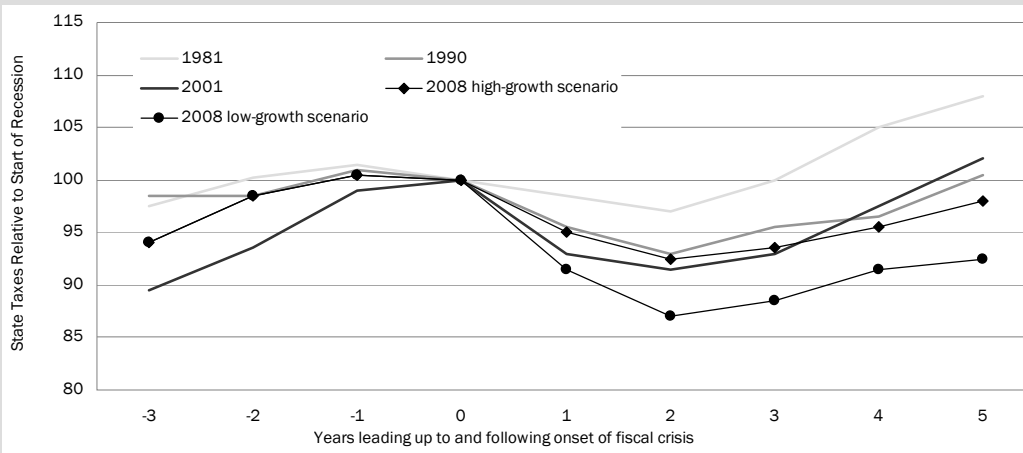
expected to boost the state's economy in the short-term because the benefits of maintaining public expenditures outweigh the loss of consumption. In the context of an economic downturn, temporary tax increases can increase employment because many households save portions of their income and have been shown to reduce spending only by a fraction of the tax increase they face.<sup>31</sup> The state, on the other hand, spends all of the proceeds of the tax, and most of it within the state. If the tax increase is progressive – imposing higher effective rates on those with higher incomes – the reduction in consumer spending will be smaller and the net increase in employment larger.

Beyond the actions already taken there is arguably room for further tax increases to support public spending for education and infrastructure in New England.

The other New England states could generate considerable revenue by following the lead of Connecticut or the other eight states adopting new income tax brackets and raising top marginal rates (Johnson et al, 2010). Connecticut's increase is expected to generate hundreds of millions of dollars in tax revenue. Additionally, states could limit the exclusion of capital gains income. Rhode Island will generate tens of millions of dollars by its move to eliminate special treatment of capital gains income.<sup>32</sup>

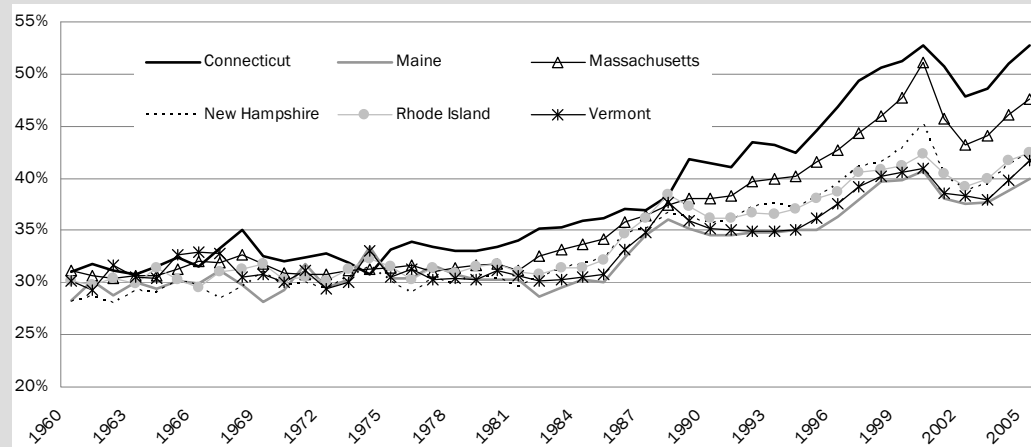
There are also reasons to consider permanent tax changes that shift more of the tax burden to affluent households. High income households have benefited from decades of economic growth far more than typical households and also face the lowest effective state and local tax rates. After remaining relatively stable for

FIGURE 6. "REAL" STATE TAXES BEFORE AND AFTER RECENT FISCAL CRISES (ADJUSTED FOR POPULATION GROWTH, INFLATION AND LEGISLATIVE CHANGES)



Source: Rockefeller Institute

FIGURE 7. INCOME SHARE OF TOP TEN PERCENT OF HOUSEHOLDS (1960 TO 2005)



Source: Frank, 2009.



TABLE 16. IMPACT ON REVENUE AND AFTER-TAX INCOME FROM TWO PERCENT SURCHARGE ON AFFLUENT HOUSEHOLDS (AGI ABOVE \$200,000) IN NEW ENGLAND

	CT	ME	MA	NH	RI	VT
Average After-Tax Income (AGI* less tax liability)						
including only federal income taxes	\$485,513	\$344,806	\$405,186	\$369,999	\$361,469	\$373,128
including federal income taxes and estimate of total current state and local taxes**	\$439,614	\$309,752	\$369,945	\$354,653	\$325,739	\$337,500
including current federal, state & local taxes, and 2% surcharge	\$426,612	\$300,922	\$359,330	\$345,062	\$316,336	\$328,000
Share of total filers with AGI above \$200,000	5.6%	1.8%	4.6%	3.0%	2.6%	2.1%
Total revenue generated by surcharge (millions)	\$1,261	\$98	\$1,577	\$195	\$127	\$64

Source: PERI analysis of IRS SOI data for 2008.

\* Adjusted Gross Income (AGI) is income less deductions in the federal income tax code. Deductions include a portion of self-employment taxes and moving expenses, alimony paid, contributions to IRAs, student loan interest payments, and certain business expenses among others.

\*\* State and local tax estimates estimated by applying ITEP effective tax rates for top five percent of households to AGI. Rate for top five percent of households based on weighted average of top one percent and next four percent.

TABLE 17. TOTAL STATE AND LOCAL TAXES AS A SHARE OF INCOME, BY HOUSEHOLD INCOME GROUP (REFLECTING TAX CODE THROUGH OCTOBER 2009; INCLUDES FEDERAL OFFSET)

	Lowest 20%	Second 20%	Middle 20%	Fourth 20%	Top 20%		
					Next 15%	Next 4%	Top 1%
Connecticut	12.0%	9.7%	9.9%	9.6%	8.5%	7.6%	4.9%
Maine	9.5%	9.2%	9.8%	9.8%	9.5%	8.2%	6.9%
Massachusetts	10.1%	10.1%	9.6%	8.8%	7.7%	7.1%	4.8%
New Hampshire	8.3%	6.6%	6.3%	5.8%	4.6%	3.5%	2.0%
Rhode Island	11.9%	10.0%	10.1%	9.5%	8.5%	8.1%	5.6%
Vermont	8.2%	8.0%	9.4%	9.2%	8.2%	7.5%	7.5%
US Average	10.9%	9.9%	9.4%	8.5%	7.4%	6.7%	5.2%

Source: ITEP, Who Pays?, November 2009.

decades, the share of income held by the highest-income ten percent of households has risen dramatically since the early 1980s (figure 7, page 29).<sup>33</sup> In Connecticut, the income share of the top ten percent rose from 33 percent in 1979 to 53 percent in 2005. In Massachusetts the increase was from 31 percent to 48 percent. Analysis of top-income shares since 2005 suggests that inequality has declined only very slightly in the last few years; after climbing even higher between 2005 and 2007, the Great Recession has pushed inequality back down to 2005 levels (Smeeding and Thompson, 2010).

Even if they are asked to pay higher taxes, affluent households will still enjoy a very high standard of living. A two-percent surcharge – or an equivalent new top income tax bracket – for households with incomes

above \$200,000, for example, would generate tens of millions of dollars in additional revenue in the smaller New England states and nearly \$1.6 billion in Massachusetts (table 16). The after-tax income of these households, though, would remain quite high. In Massachusetts, the average after-tax income (including federal income taxes and all major state and local taxes) of households with incomes above \$200,000 – approximately the highest-income five percent of households – would fall from \$370,000 to \$359,000.

Because states have regressive tax systems – with higher effective tax rates on those with lower incomes – the same households who have benefitted most from economic growth are also paying the lowest effective tax rates. In each of the New England states, as in the rest of the country, the lowest-income fifth of house-

holds now pays a larger share of their income for state and local taxes than do the highest-income one percent of households (ITEP, 2009). In New Hampshire the lowest-income fifth pays 8.3 percent of its income for state and local government, while the highest-income one percent pays just 2.0 percent (table 17, page 30). Vermont has one of the least regressive tax systems in the country, but even there low-income households pay more; the lowest-income fifth of Vermonters pays 8.2 percent, while the top one percent pays 7.5 percent. Even with a two-percent surcharge, the effective combined state and local tax rates for affluent households would remain below the rates faced by middle and low-income households in most New England states.

Implementing progressive tax changes will generate much needed revenue for the states, but is unlikely to lead to substantial negative consequences. The impact on consumer spending of high-income households was discussed earlier (see Section IV.B.i. and footnote 21). The fear that people will flee the state is exaggerated as well. The research on this question suggests that even the most potentially mobile households are unlikely to move across state lines in response to taxes. The deductions and other tax incentives increasingly directed to attract older taxpayers, thought to be particularly mobile around retirement age, have been shown to have no impact on their migration behavior (Conway and Rork, 2010). Even state-level estate and inheritance taxes, which imply relatively large tax burdens for wealthy families, have only a modest impact on location behavior (Bakija and Slemrod, 2004).

### **Bonds to finance infrastructure projects**

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Because infrastructure projects are typically financed through bonds, they are not subject to the same balanced budget limitations as general fund spending. The feasibility of additional bond financing for infrastructure projects depends on the ability of states to repay the bond and investors' assessments of that ability. The rating agencies continue to give relatively high ratings for the bonds of state and local governments in New England.<sup>34</sup> Combined with continued low interest rates, the ratings suggest further room for bond-financed projects in New England. This is particularly true for the smaller states in region, which not only have high bond ratings, but also currently maintain relatively low levels of tax-supported debt. Public tax-supported debt as a share of personal income is well below the national

average in Vermont, Maine, and New Hampshire (Moody's, 2009).<sup>35</sup>

High bond ratings, which impact the ability to borrow for future projects as well as the cost of financing debt from previous projects, are jeopardized when states do not levy taxes sufficient to pay for services. This is demonstrated by recent events, with Connecticut's bond rating being downgraded as a result of excessive reliance on borrowing and use of one-time funds to balance the state budget.<sup>36</sup> Raising taxes to maintain vital public services and issuing bonds to finance infrastructure projects should be seen as complements, not substitutes.

### **Reallocating resources from tax incentives to public services**

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In addition to generating additional revenues, states are being forced to prioritize how they allocate current resources. Part of that process should be to reconsider existing tax expenditures. "Tax expenditures" are a form of government spending that allocates tax revenues before they are collected by providing exemptions, exclusions, or deduction for certain groups or activities. Tax expenditures have been growing rapidly over the last two decades in New England and the rest of the country, and now represent a considerable pool of resources. Total tax expenditures for FY2011 are anticipated at \$1 billion in Vermont, \$3.5 billion in Maine, \$5.6 billion in Connecticut, and \$23 billion in Massachusetts (table 18, page 32).<sup>37</sup>

Tax expenditures include treatment of income for conformity with federal income tax rules, as well as popular programs such as the Earned Income Tax Credit, in addition to the economic development tax incentives described earlier. The use of these tax incentives has been widespread and growing over the last decade (table 3, p. 9 and figure 4, p.10). In the smaller New England states, these incentives now add up to more than \$400 million of dollars every year, and in the larger states they reach billions of dollars.

TABLE 18. TOTAL IDENTIFIABLE TAX EXPENDITURES  
(MILLIONS OF DOLLARS)

	Connecticut	Massachusetts	Rhode Island	Maine	Vermont
FY88			351		
FY95		7,608			
FY96		7,933			
FY97		8,163			
FY98		11,584			
FY99		12,626			
FY00		13,524	480		
FY01		13,578			
FY02	3,928	13,503			
FY03		14,108	696		
FY04		14,918			
FY05	4,391	17,119	721		788
FY06		18,526		2,958	820
FY07		19,608	646	3,075	
FY08		19,080		3,045	
FY09	4,991	18,879		3,190	
FY10		21,738		3,344	
FY11	5,611	23,055		3,473	1,056

*Note:* The amount of tax expenditures reflects both the rising use of credits by the states, but also the improved and expanded reporting of those credits. Later year reports tend to be more comprehensive, including expenditures in all types of taxes.

*Sources:* [www.maine.gov/revenue/research/](http://www.maine.gov/revenue/research/)  
[www.cga.ct.gov/ofa/RevenueReports.asp](http://www.cga.ct.gov/ofa/RevenueReports.asp)  
[www.tax.state.ri.us/reports/index.php](http://www.tax.state.ri.us/reports/index.php)  
[www.state.vt.us/tax/expenditurereports.shtml](http://www.state.vt.us/tax/expenditurereports.shtml)  
[www.mass.gov/bb/h1/fy11h1/tax\\_11/hall.htm](http://www.mass.gov/bb/h1/fy11h1/tax_11/hall.htm)

## VI. CONCLUDING REMARKS

Facing high unemployment for several more years, state policymakers will continue to face pressure to take action to create jobs in New England. Options available at the state-level are limited, but the available evidence suggests that the most effective approaches are to improve the region's educational institutions and infrastructure. Instead of trying to lure firms with deals and lower taxes on corporations, an approach to economic development that builds the skills of the current and future workforce, improves the physical infrastructure of regions, and makes communities more attractive places for families and firms represents a more effective use of a state's scarce resources. In addition to reallocating the resources currently funding existing tax incentive and subsidy programs toward investments in education and infrastructure, states should also be considering raising additional new revenues through bonds as well as progressive tax increases.

## NOTES

<sup>1</sup> Foreclosure rates in New England are lower than in the rest of the country for a variety of reasons, including an older population in New England than the rest of the country as well as much lower rates of population and housing growth and less exposure to the sub-prime mortgage crisis.

<sup>2</sup> Month-to-month changes in employment in smaller states should be treated cautiously since they are based on surveys with relatively small sample sizes. Recent revisions to the BLS monthly survey methodology have removed state-level adjustments previously made by state labor departments. This move is expected to make monthly changes even more volatile for small states.

<sup>3</sup> These four types of tax credits are the subject of thorough review by Jennifer Weiner of the Boston Federal Reserve Bank, “State Business Tax Incentives: Examining Evidence of their Effectiveness,” New England Public Policy Center Discussion Paper 09-3, December 2009.

<sup>4</sup> RI Dept. of Revenue Division of Taxation, “Tax Credit and Incentive Report.” CT Legislative Assembly Office of Fiscal Analysis, “Connecticut Tax Expenditure Report,” January 2008.

<sup>5</sup> Massachusetts Budget and Policy Center, “Economic Development Tax Expenditures,” December 2, 2009.

<sup>6</sup> Connecticut Voices for Children, “Business Tax Credits: The Blank Check in Connecticut’s Economic Development Portfolio?” March 2008.

<sup>7</sup> For a discussion of the issues surrounding state-level tax expenditure reports, including an assessment of the relative strengths of the reports provided by each state, see Levitis, Johnson, and Koulish (2009).

<sup>8</sup> In its analysis, the Massachusetts Budget and Policy Center follows the definition of economic development tax expenditure suggested by the Council on State Governments, which is tax expenditures used for the purposes of creating, retaining, or attracting business and development to the state. “These include a variety of tax incentives including sales and use tax exemptions for new equipment, materials used in manufacturing, tax incentives for creating new jobs, for encouraging research and development, for development in designated areas, and tax expenditures related to workforce development, such as credits for tuition and student loans.”

<sup>9</sup> Vermont’s most recent tax expenditure report (provided by Susan Mesner of the Vermont Tax Department via personal communication March 31, 2010) is the first report which contains estimates of tax expenditures for all major taxes in the same fiscal year. Previous reports included a subset of taxes in each reporting year. Maine’s report has included estimates for all major taxes for a longer period of time, but there is a distinct break in the method for evaluating many of tax expenditures between the 2007 and 2009 reports. Table 3.5 shows Maine’s total expenditures between FY08 and FY11 as well as the slightly longer trend for those expenditure categories that were evaluated using a consistent approach between FY06 and FY11. For expenditure categories that reported an estimated range instead of a specific value, we used the mid-point of the range to calculate the totals.

<sup>10</sup> See Weiner (2009) for a review of the methods, including questionable assumptions, used in many of the studies of the economic impacts of tax incentives.

<sup>11</sup> Alternatively, McGuire is convinced by the research showing that inter-regional differences in taxes can plausibly have large impact on employment and other outcomes.

<sup>12</sup> Census Bureau, State and Local Government Finances.

<sup>13</sup> Rockefeller Institute of Government, “Infrastructure, Federal Stimulus, and State-Local Finances,” Aug. 1, 2009.

<sup>14</sup> Heintz, James, Robert Pollin, and Heidi Garret-Peltier, “How Infrastructure Investments Support the U.S. Economy: Employment, Productivity, and Growth,” PERI, January 2009. Available at: [www.peri.umass.edu/fileadmin/pdf/other\\_publication\\_types/green\\_economics/](http://www.peri.umass.edu/fileadmin/pdf/other_publication_types/green_economics/).

<sup>15</sup> Historically, federal infrastructure grant programs have contributed from half of the cost of constructing wastewater treatment facilities to 90 percent of highway construction costs (CBO, 1990). In 2004, total federal grants and subsidies were one-fifth of the level of state and local government “own-source” infrastructure spending, including subsidized and unsubsidized projects (CBO, 2008).

<sup>16</sup> While the studies from the early 1990s that found no impact from public infrastructure investments (Holtz-Eakin, 1994; Garcia-Mila et al, 1996) were generally regarded as improvements on Aschauer (1989), they also had important weaknesses. In these studies, the researchers relied on “production functions” and controlled for unobserved state effects using first differences. These production function studies implicitly assume that firms face fixed input quantities. Some economists reject the plausibility of this assumption, and instead estimate “cost functions,” which instead assume that firms face fixed price levels when making their optimizing decisions. Many of the recent studies finding strong positive effects of infrastructure investment estimate cost functions, including a series of studies by Morrison Paul and her co-authors (Morrison Paul et al, 1996a, 1996b, 2004, 2007). Early cost function studies include Eberts (1990), which found that the stock of public infrastructure in U.S. metropolitan regions has positive impacts on private sector productivity, for both labor and overall productivity (total factor productivity (TFP)). Nadiri and Mamuneas (1994) use detailed U.S. manufacturing industry data – to capture the differential responses across sectors – and show that public infrastructure and R&D investments have significant effects on private-sector costs and productivity. Using Swedish data, Berndt and Hanson (1991) also show that increases in the stock of public infrastructure reduce costs in the private sector.

<sup>17</sup> The studies by Haughwout (2002) and Albouy (2009) both extend the Rosen-Roback compensating differentials model. As Albouy shows, however, Haughwout’s model only uses two of the three key equations in the model – those for wages and the price of land. Albouy shows that properly incorporating the third equation, the housing production function, makes a meaningful difference for empirical applications of the model.

<sup>18</sup> Number of public schools and students from NCES: [http://nces.ed.gov/programs/digest/d08/tables/dt08\\_005.asp?referrer=list](http://nces.ed.gov/programs/digest/d08/tables/dt08_005.asp?referrer=list); [http://nces.ed.gov/programs/digest/d08/tables/dt08\\_002.asp?referrer=report](http://nces.ed.gov/programs/digest/d08/tables/dt08_002.asp?referrer=report).

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<sup>19</sup> NCES, *Projections of Education Statistics to 2018*, NCES 2009-062. Available at: <http://nces.ed.gov/pubs2009/2009062.pdf>. See tables 1, 10.

<sup>20</sup> [www.doleta.gov/Performance/results/AnnualReports/annual-report-08.cfm](http://www.doleta.gov/Performance/results/AnnualReports/annual-report-08.cfm)

<sup>21</sup> Conservative estimates from research on consumer responses to changes in income and social security taxes suggest that affluent households might reduce their consumption by up to half of the amount of a temporary tax increase. A number of studies have found that consumption does respond to tax changes, and that the response is smaller among higher-income households. Johnson et al (2006) find that high-income households spent roughly half of their 2001 income tax rebate on nondurable goods, while Parker (1999) showed that when the earnings of high-income households rose beyond the social security payroll tax cap, spending increased by one half of the predictable increase in after-tax income. For several reasons, we consider the 50 percent reduction in spending by high-income households under a temporary tax increase to be fairly conservative. For one thing, households at the \$69,000 considered by Johnson et al (2006) and at the Social Security cap considered by Parker (1999) are much closer to middle-income than high-income. These households will find it harder to maintain their desired level of consumption than households with incomes above \$150,000 that we are considering here. In addition, the evidence in Johnson et al (2006) and Parker (1999) is based on consumer responses to a tax rebate. For affluent households, spending out of tax rebates will arguably be greater than reductions in spending out of temporary tax increases. This will be the case if the rebate is viewed as a one-off source of found money that can be spent on an extravagance, while the household is loathe to reduce its standard of living in response to a temporary tax increase.

<sup>22</sup> Levin et al also include discussion of the Perry/High-Scope Preschool Program and the Chicago Child-Parent Center Program, but the impacts of these programs is addressed later. Levin et al also discuss impacts of increases in teacher salaries on educational outcomes, but these findings are based on non-experimental results and are not discussed here.

<sup>23</sup> Studies of the STAR class size reduction reform include: Mosteller, 1995; Krueger, 1999; Finn and Achilles, 1999, and; Finn et al, 2005.

<sup>24</sup> Separate experimental evaluations of First Things First have been conducted by MDRC (Quint et al, 2005) and Youth Development Strategies, Inc. (Gambone et al, 2004), both of which are available at: <http://irre.org/evaluations/>.

<sup>25</sup> The long-term impacts calculated by Bartik reflect the annual impacts in the 75<sup>th</sup> year of operation of a universal program, relative to employment and average earnings if the program had not been implemented. In many ways, Bartik's analysis is relatively conservative, adopting Wasylenko's findings of the impacts of economic development tax incentives and subsidies programs and disregarding a whole host of social benefits – such as decreased costs incarceration – in his calculations.

<sup>26</sup> Per-pupil expenditure figures are adjusted for cross-state differences in the cost of providing education using the index developed by Berry et al (2000). The Berry index is a measure of cost of living which reflects differences in housing prices, population, and per-capita incomes across states, and is available for all states (not including Washington D.C.) for 1960 to 2007. Another standard approach to adjusting education spending for cross-state differences is using the Comparable Wage Index (CWI) developed by NCES. The CWI is based on cross-state differences in the annual earnings of college-educated workers not involved in the education sector. The CWI, however, is available only up through 2005. Also, the CWI is based on analysis of Census data from 1999-00. Annual updates of the CWI are based on overall (occupational-mix adjusted) changes in earning at the state-level and do not control for demographic or other shifts.

<sup>27</sup> Current expenditures do not include capital investment and construction projects.

<sup>28</sup> PERI analysis of SHEEO SHEF reports for 2004 and 2009.

<sup>29</sup> Budget shortfalls are the gap between revenue required to maintain existing service levels and forecast or actual revenue (McNichol and Johnson, 2010, 2).

<sup>30</sup> These tax changes are detailed in Johnson et al (2010). Connecticut implemented a new top bracket in its income tax and also enacted a corporate income tax surcharge. Rhode Island eliminated special treatment of capital gains income. Vermont implemented a number of changes in its sales and income taxes.

<sup>31</sup> See Orszag and Stiglitz (2001) and Thompson and Garrett-Peltier (2010) for additional discussion.

<sup>32</sup> Vermont also eliminated a special exemption for capital gains income, but simultaneously reduced all personal income tax rates, limiting the revenue increase from the policy to just \$9 million.

<sup>33</sup> Income share of high-income households is based on analysis of IRS tax records by Mark Frank (2009).

<sup>34</sup> Current bond ratings for the New England states are tracked by the Vermont state Treasurer and made available at: [www.vermonttreasurer.gov/debt-management/state-bond-ratings](http://www.vermonttreasurer.gov/debt-management/state-bond-ratings).

<sup>35</sup> Tax-supported debt as a share of personal income in 2008 was 3.1 percent for the average U.S. state and just 2.2 percent in Maine, 1.8 percent in Vermont, and 1.3 percent in New Hampshire. The debt share was above the national average in the remaining states; 4.5 percent in Rhode Island, 8.2 percent in Connecticut, and 8.9 percent in Massachusetts. (Moody's, 2009).

<sup>36</sup> See Keating, Christopher, "State's Bond Rating Downgraded; Borrowing Money for Operating Expenses and One-Shot Revenues Cited," *Hartford Courant*, June 4, 2010.

<sup>37</sup> Tax expenditures for New Hampshire are not included here because the state does not report on expenditures from a broad range of taxes, but instead only tracks corporate income tax expenditures. New Hampshire also does not make its report available online. Rhode Island's most recent report reflects expenditures through FY2008.

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